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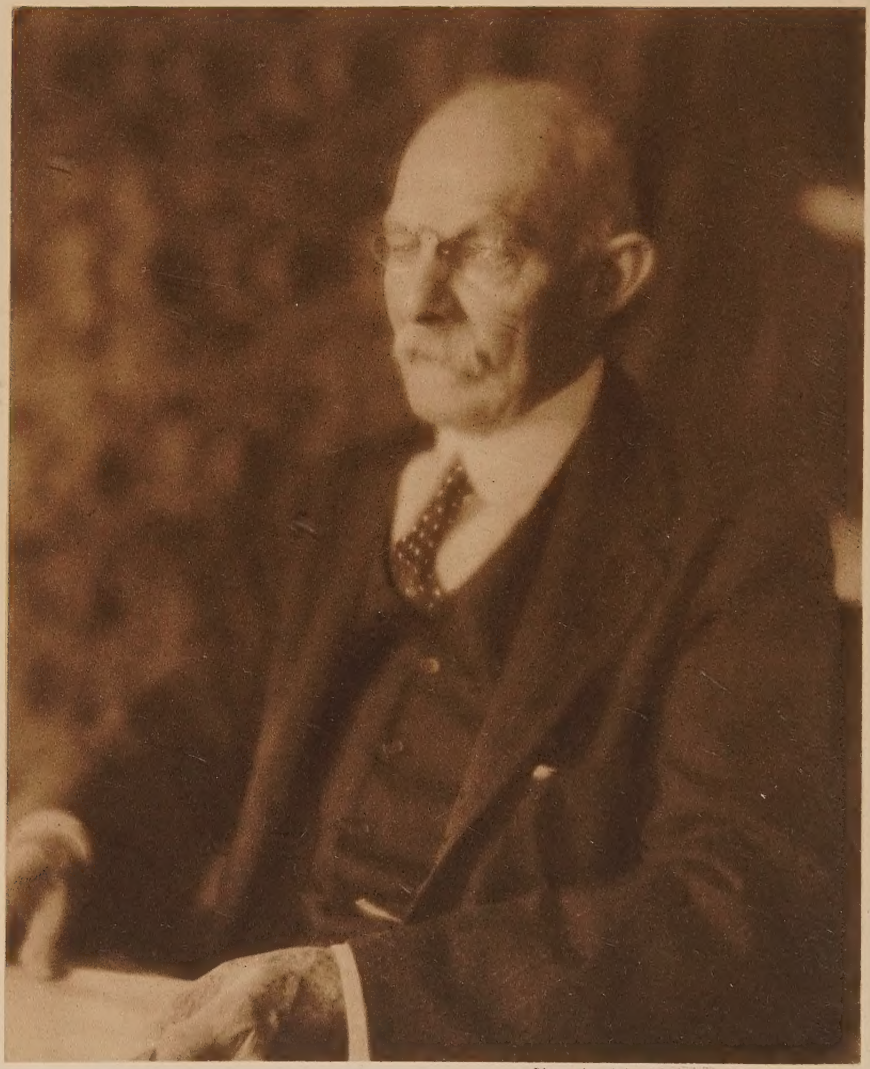

Photo by John H. Stocksdale

William Stewart Halsted, 1922

WILLIAM STEWART HALSTED

SURGEON

BY

W. G. MacCALLUM

INTRODUCTION

BY

DR. W. H. WELCH

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INTRODUCTION

I welcome the opportunity of writing an introduction to this biography of Dr. Halsted by Dr. MacCallum.

It has been said that one should select his biographer with as much care as his executors, and surely no choice as the writer of Halsted's biography could have been more fortunate or more satisfactory to Dr. Halsted and his friends than that of Dr. MacCallum, his pupil, colleague and friend of many years.

While I had collected material and had contemplated writing a biographical sketch of Halsted, introductory to the volumes of his collected papers, edited with so much pains and intelligence by Dr. Burket, I became aware that our relations had been so intimate that there were sides of his personality and character presented to others which were not familiar to me, and that an adequate portrayal of Halsted's life and work required a more detached point of view than it was possible for me to occupy.

Readers of this biography will recognize that Dr. MacCallum possesses a knowledge and sympathetic judgment which have enabled him to present a vivid and truthful portrait of one whose interesting and unusual personality, whose great influence as teacher and surgeon, and whose important scientific

and practical contributions to surgery merit such a narrative of his life and work as is here offered.

All the pupils, associates, friends and admirers of Halsted have reason to be grateful to Dr. MacCallum that he has undertaken and completed so successfully a task, which, while it was a labor of love, necessitated great sacrifice in time and diversion from other responsible duties, as well as much research and correspondence, and was not unattended by annoyances.

Dr. MacCallum has been at great pains to acquaint himself with Halsted's ancestry and his student days both in this country and in Germany, and especially to rescue from forgetfulness those vigorous years of his remarkably active and successful career as a teacher and surgeon in New York before coming to the Johns Hopkins Hospital and University—a period offering in many respects a singular contrast to his more familiar professional career in Baltimore, although embodying the germs of his subsequent scientific and surgical interests and achievements.

My close friendship with Halsted and familiarity with his ideas and work date from the beginning of his professional life and work in New York. It was there that he developed a system of extramural teaching with laboratory, dispensary and hospital work and practical demonstrations, which became so attractive and popular with students as to create positive embarrassment to the medical colleges. While he changed radically in Baltimore his methods

of teaching, no estimate of Halsted should overlook his demonstrated capacity to be the popular teacher of the quizmaster type, if he so desired.

His organization and conduct of the Out-patient Service at Roosevelt Hospital so as to make this dispensary a lively center for the study of injuries and diseases in ambulatory patients was a notable contribution of that period and became a source of inspiration to those fortunate enough to become his pupils and assistants.

Even then I recognized that Halsted combined, in a degree rarely matched, the interests of the practical surgeon with those of the experimental biologist in his fundamental studies of the processes of wound-healing and of the handling of wounds, as well as of surgical injuries and diseases in general. With all of his important contributions to practical surgery, it is this genuinely scientific attitude of mind and mode of approach to the solution of surgical problems which give the characteristic stamp to Halsted's thinking and work.

While from time to time Halsted attacked with marked success many surgical problems, and there was no side of the surgeon's craft which did not interest him, his continuous and abiding interest centered upon the fundamental problems of wound healing and repair, and in this field lie his most important contributions to surgery.

The recognition and application of the principles of antiseptic surgery introduced by Lister were slow in making their way in England and in America, and when Halsted appeared upon the surgical scene they had found only halting and partial acceptance in this country. It is safe to say that no one did more by precept and by example to secure the triumph of antiseptic surgery in America than Halsted, and certainly no one has done more to improve still further methods of wound treatment by guarding against accidental infection and by meticulous care in the gentle handling of injured tissues.

While brilliancy, boldness and manual dexterity were attributes which I used to hear applied to Halsted as a surgeon in New York, these were precisely the qualities which in Baltimore he resented and desired to be substituted by conscientiousness, thoroughness and safety.

Halsted's professional advancement in New York was unprecedentedly rapid. His college positions, his extramural teaching and the mere list of hospitals to which he was appointed visiting surgeon, in one instance visiting physician, give some indication of the almost incredible amount of work which he had assumed, more indeed than any one man should undertake or could continue to carry. But I like to recall the Halsted of those days when he was in his physical prime—a model of muscular strength and vigor, full of enthusiasm and of the joy of life. I retain delightful memories of the circle of friends,

mostly not medical, which used to gather once or twice a week for dinner, or a social evening, occasionally a musicale, at the cheerful home of the two bachelors, Halsted and Dr. Tom McBride, who kept open house on East 25th Street.

In the pages of this narrative will be found the story of the break-down in Halsted's health and of the circumstances which brought him to me in Baltimore. I had guarded unviolated for so many years the confidence which Halsted had placed in me that I confess I was surprised to learn that the secret was more widely known than I had suspected, and its publication after his death shocked me. I now realize that not only should the facts be made known, but that instead of reflecting injuriously upon Halsted's character, they bring out a strength of will and tenacity of purpose and a triumphant issue of a hard struggle rarely exemplified in similar circumstances.

With all the details of Halsted's life and work in Baltimore Dr. MacCallum is thoroughly familiar. He has told the story with admirable skill and insight. It was here that Halsted created a school, for he is one of the relatively few surgeons who may be truthfully said to be creators of a school.

It is at best not easy, and certainly in these introductory remarks not possible, to indicate all the ingredients which contribute to the formation of a school, such as is here in mind. More is meant than is implied by such terms as teacher and pupil, of master and disciple. Among the essentials are cer-

tain qualities of personality, very real even if indefinable, in the head of the school, a certain cementing and pervasive spirit of loyalty on the part of both leader and follower, and certain fundamental principles guiding thought and action, while leaving full freedom of individual development.

Halsted often said that he found the greatest satisfaction of his life in the training of surgeons. Assuredly the successful careers as well as the devoted loyalty of so many of those who had the good fortune to be his pupils, assistants and resident surgeons and were proud to call themselves of the "Halsted School" must have given him abundant cause of satisfaction.

We, his colleagues of the medical faculty, always regarded Halsted as embodying the highest ideals of the university professor, of the scientific investigator, and of the clinical teacher and surgeon. The organization and work of Halsted's surgical clinic at Johns Hopkins marked a contribution to medical education and research not less important than those of Osler's medical clinic and of Kelly's gynecological clinic. He was in complete sympathy with the so-called full-time or university system and indeed, with his comparative indifference to the cultivation of an absorbing private practice he had exemplified from the beginning of his connection with the Johns Hopkins Hospital and Medical School the basic principles of this reform of clinical organization and teaching. No more fortunate combination of com-

plementary interests and talents could be desired than the association of Halsted and Finney in the working of a university surgical clinic.

For the modern psychological or psychographic style of biography Halsted's personality would not be an easy theme and doubtless would receive varying interpretations by those who might essay the essentially impossible task of such analysis. Dr. MacCallum, without attempting any such psycho-analytic study, is remarkably successful in his depiction of the traits and characteristics of Halsted's interesting personality.

With his intimates, who were few, Halsted was the most delightful of companions, full of original, whimsical humor, matchless in sharpness and quickness of repartee, stimulating and interesting in conversation, more interested in intellectual and scientific subjects than in topics suggested by the current news of the daily papers, delighting his friends by unexpected and unconventional views and comments on men and affairs, capable of subtle, at times caustic irony—a gift which he had difficulty in restraining on occasions when its expression might be inappropriate.

Dr. MacCallum has well portrayed sides of Halsted's personality more often apparent to the public—his reserve and aloofness, his reticence, his niceness in dress and personal habits, his artistic taste for old furniture, his reluctance to be photographed, to make public speeches and appearances,

to engage in controversy, amounting to absolute indifference in the assertion of prior claims to discovery or invention. He was truly a gentleman, with something of the Brahman and aristocrat about him. He was impatient with dulness and stupidity. If critical of others he was not less critical of himself. He was extremely modest in the estimate of his own natural endowments and accomplishments. Those who knew Halsted well—his patients, and many of his pupils and assistants—know that at heart he was essentially good, sincere, generous and kindly, unsparing of himself in the relief of suffering.

Halsted was a lover and seeker of truth, possessing in eminent degree the qualities of the productive scientific investigator—richness in suggestion, clearness in formulation of his problems, keenness in observation, ingenuity in adapting experiment to solution of the problem in hand and lack of bias in the interpretation of results, even when in conflict with his own published opinions. As others have pointed out there was much of the spirit of John Hunter and of Claude Bernard in the emphasis placed by Halsted upon experimental, biological methods in the study of many surgical problems.

No honor came to Halsted more appreciated and more deserved than his election to membership in the National Academy of Sciences, which recognizes only published scientific work of a high order as a qualification for membership and hitherto has practically ignored contributions in the clinical field as consti-

tuting such qualification. Halsted was happy to share this honor with his former assistant and resident surgeon, Harvey Cushing, of whose distinguished career and contributions he was most appreciative.

While, like all who make important additions to science, literature or art, Halsted built the monument which will perpetuate his memory, Dr. MacCallum has rendered a great service to our own and to future generations in setting forth in permanent record and with complete understanding and sympathy the essential facts and events in the life and work of Halsted and in leaving with us a truthful picture of the man as he revealed himself to the world.

William H. Welch.

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I

THE HALSTED FAMILY

William Stewart Halsted was born in New York on September 23, 1852. In attempting to learn his descent, it is found that he came from a family of Halsteds that can be traced back to the sixteenth century in England, where they had an estate in Rowley Parish called High Halsted. Their neighbors were the Townleys, and even then there were intermarriages between these families, but later the connection became very close because one of the Halsteds and one of the Townley family, Richard Townley Haines, married sisters, the daughters of John Johnson, and their children again married as cousins and were the parents of William Stewart Halsted. All this is so complicated that it seems excusable to introduce here a genealogical tree showing the two families in their most closely connected branches, in so far as they are intimately related to the subject of this sketch or to the surviving persons with whom he was acquainted. This has been put together from various sources such as the casual mention of relatives in old letters but it could not have been completed without the aid of Mrs. Terry, a sister of Dr. Halsted, and of Miss Rosalie Halsey, although the book published by Munsell on the Halsted family gives many details of other branches of

the large family. Such an effort can succeed in tracing only the more direct line, but it is evident that since in those days the families nearly all boasted of ten or more children, the race is now very widespread throughout this country.

The first immigrants were two brothers, one of whom, Timothy Halsted, settled as a landowner at Hempstead, Long Island, in 1660. The family seems to have moved in the early days to Elizabethtown, New Jersey, and not much can be learned except that one of them, Robert Halsted, was a doctor there and during the Revolutionary War was imprisoned by the British because of his political attitude. One of his sons was William Mills Halsted, the founder of the firm of Halsted, Haines and Company, wholesale importers of dry-goods. He began business with Van Gesen and Van Blarcom in New York, and when he was twenty-one years old went into partnership with R. T. Haines. This partnership proved successful and the firm became very prosperous. From this time on the family occupied a prominent position in New York, being not only financially important, but active also in various philanthropic projects. William Mills Halsted was a founder of the Union Theological Seminary, of the American Bible and Tract Society, an elder in the University Place Presbyterian Church and a Governor of the New York Hospital and Bloomingdale Asylum. It was he who built the large square three-story house on the northwest corner of Fifth

Avenue and Fourteenth Street about 1835. He built three adjoining houses for his children, and Mrs. John Kirtland Myers lived in the first, William M. Halsted, Jr., in the next, and Dr. Thaddeus M. Halsted in the third. Later the old Halsted house was turned into an armory and afterward became Brewster's Hall.

Some of his letters to his son, William Mills Halsted, Jr., who was to be Dr. Halsted's father, written when the boy was a student at Williams College in Williamstown, have been preserved and it may be interesting to quote them here because they give a rather vivid picture of the time, and especially reflect the attitude of the elders of the church in those days when the sinfulness of walking on Sunday, except to go to church, made the walk to church so popular.

New York, June 1st, 1843.

My Dear Son

I have been looking for a letter from you for some days. I have not heard how you reached Williamstown, how you found Prof. Kellogg and family nor anything relating to you or acquaintances generally in the village. I shall be pleased to hear soon and hope to learn that you have set yourself dilligently to master your lessons. If my children do not do well I shall be *unhappy,* particularly if their ill doing arises from impropriety of conduct of their own. I trust you will seek to do right and be preserved from evil ways. I have cautioned you often to avoid idle and vicious companions, and would most earnestly repeat it. With the exception of your sister Maria, our family have been in health since you left. She labored with her needle to assiduously for yourself and

Robert for many weeks, and her strength gave way the day after you left. She had a severe chill which lasted nearly two hours on Wednesday afternoon, it was followed by fever and much distress in her head for about forty eight hours. Medicine gave relief and she has now so far recovered as to sit up most of the day. In a few days I hope she will be about house as usual. Your cousin Morton arrived here on Tuesday in the ship Virginia from Liverpool: he is looking very well, says his mama enjoys better health than for many years past. If Pine apples are to be had fresh I will cause a Box to be sent on Saturday for you by Troy Tow Boat and Mr. Wheldon will please call at the office of the Tow Boat Company for it. If received divide contents, not forgetting Tutor Coffin in the division. Make my kind regards to Mr. and Mrs. Kellogg.

Your affectionate Father

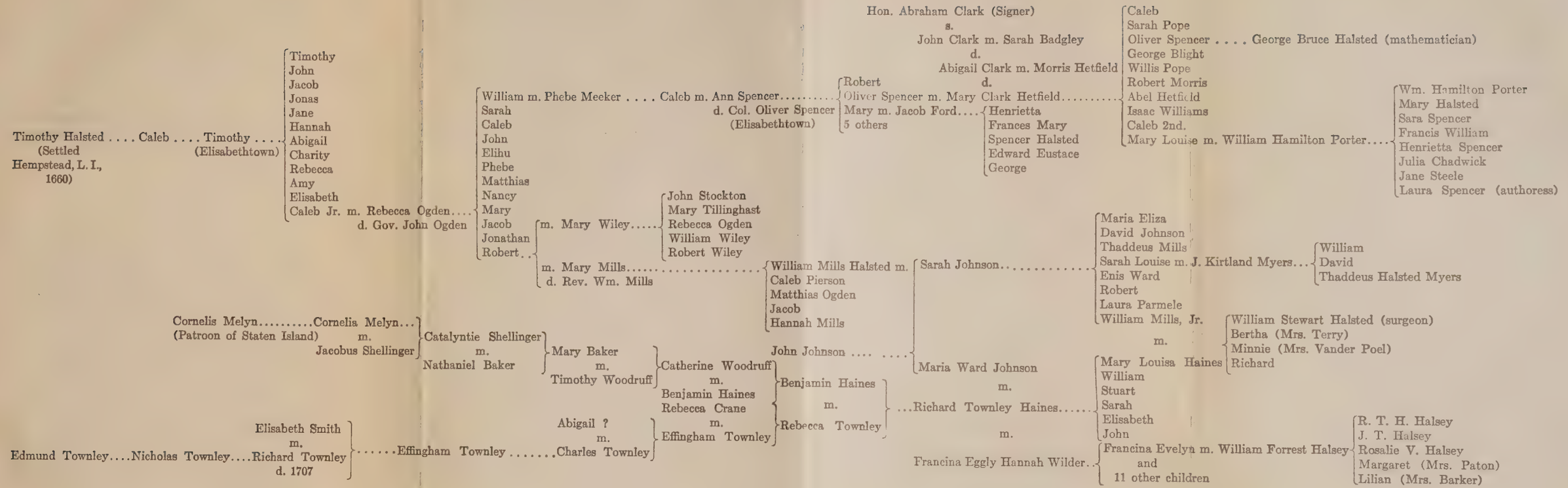
W. M. Halsted.

New York, Nov. 10, 1845.

My dear Son

I have a few lines from Dr. Alden this morning which relieves some of the anxiety we have had on your account since Thursday last. Dr. A. says you are free from fever and Headache and not any symptoms are threatening.

I trust your cold and cough will soon pass off with proper care and that you will observe all care possible. I know you have not an overshare of prudence as regards health and probably it is to a want of care that you have suffered so much already. One lesson it is important you should learn and feel deeply, that is, life and health are very uncertain, that true wisdom dictates a preparation for sickness and death whenever the Lord shall send them. The only preparation we can have is an interest in the atonement which has been offered for sin. Jesus came into the world and died to save sinners: the salvation provided will not avail any who do not truly repent of their sins and exercise faith in Jesus as


Timothy Halsted
(Settled Hempstead, L. I., 1660)
Caleb
Timothy
(Elisabethtown)
Timothy
John
Jacob
Jonas
Jane
Hannah
Abigail
Charity
Rebecca
Amy
Elisabeth
Caleb Jr. m. Rebecca Ogden
d. Gov. John Ogden
William m. Phebe Meeker
Sarah
Caleb
John
Elihu
Phebe
Matthias
Nancy
Mary
Jacob
Jonathan
Robert
Caleb m. Ann Spencer
d. Col. Oliver Spencer
(Elisabethtown)
m. Mary Wiley
John Stockton
Mary Tillinghast
Rebecca Ogden
William Wiley
Robert Wiley
m. Mary Mills
d. Rev. Wm. Mills
William Mills Halsted m.
Caleb Pierson
Matthias Ogden
Jacob
Hannah Mills
Hon. Abraham Clark (Signer)
s.
John Clark m. Sarah Badgley
d.
Abigail Clark m. Morris Hetfield
d.
Robert
Oliver Spencer m. Mary Clark Hetfield
Mary m. Jacob Ford
5 others
Henrietta
Frances Mary
Spencer Halsted
Edward Eustace
George
Caleb
Sarah Pope
Oliver Spencer
George Blight
Willis Pope
Robert Morris
Abel Hetfield
Isaac Williams
Caleb 2nd.
Mary Louise m. William Hamilton Porter
George Bruce Halsted (mathematician)
Wm. Hamilton Porter
Mary Halsted
Sara Spencer
Francis William
Henrietta Spencer
Julia Chadwick
Jane Steele
Laura Spencer (authoress)
Cornelis Melyn
(Patroon of Staten Island)
Cornelia Melyn
m.
Jacobus Shellinger
Catalyntie Shellinger
m.
Nathaniel Baker
Mary Baker
m.
Timothy Woodruff
Catherine Woodruff
m.
Benjamin Haines
Rebecca Crane
m.
Effingham Townley
Abigail ?
m.
Effingham Townley
Charles Townley
Elisabeth Smith
m.
Edmund Townley
Nicholas Townley
Richard Townley
d. 1707
Effingham Townley
John Johnson
Sarah Johnson
Maria Ward Johnson
m.
Richard Townley Haines
Benjamin Haines
m.
Rebecca Townley
m.
Francina Eggly Hannah Wilder
Maria Eliza
David Johnson
Thaddeus Mills
Sarah Louise m. J. Kirtland Myers
Enis Ward
Robert
Laura Parmele
William Mills, Jr.
m.
Mary Louisa Haines
William
Stuart
Sarah
Elisabeth
John
Francina Evelyn m. William Forrest Halsey
and
11 other children
William
David
Thaddeus Halsted Myers
William Stewart Halsted (surgeon)
Bertha (Mrs. Terry)
Minnie (Mrs. Vander Poel)
Richard
R. T. H. Halsey
J. T. Halsey
Rosalie V. Halsey
Margaret (Mrs. Paton)
Lilian (Mrs. Barker)

their Savior trusting in his merits for pardon and acceptance. Have you seen yourself to be in the sight of God an unworthy guilty sinner? Lost and under condemnation? Felt that there is no hope for you but in the atonement of Christ and have you been enabled to look unto him for salvation? If not, as you value true peace of mind here and happiness hereafter, I would urge that you delay not to look unto him who alone can give them to you.

The storm for two days past has made Thaddeus more unwell, ancle and knee to swell considerably and become painful. Other members of the family in usual health.

Your affectionate father
W. M. Halsted.

New York, December 1, 1845.

My dear Son

. . . . When the family have been together morning and evening, the absent members have been remembered in our supplications at the throne of grace.

I trust . . . . that now you have perfect health attending regularly to the discharge of all college duties. I have heard on two occasions of your absence from Wmstown which I regretted, once at Albany and then again at Pittsfield. If not anything short of a pledge to remain at home will prevent these absences, I shall assuredly exact it from you hereafter—societies to the contrary notwithstanding. Two weeks from the coming Wednesday I suppose you will put your face homewards and I hope you will leave Wmstown in the morning—not in the evening, exposure at night by riding in stages or sleighs should be avoided if possible. After leaving Wmstown come directly home not stopping to spend the time with acquaintances at Pittsfield or elsewhere. If the river shall be open to Albany that will probably be your best route home. If closed by ice, then Springfield and Hartford—or Bridgeport. . . . . Your brother Thaddeus does not get relief from

the rheumatism. He goes out daily unless the weather is very bad but has to hobble along. I fear he may long suffer from it. Other members of the family in usual health. Messrs Brooks and Van Beuren with their families are in the houses they have taken. Mr. Brooks is one of the editors of the Express. Major Van Beuren is the eldest son of Ex President Van Beuren.

Your affectionate father
W. M. Halsted.

The brother of this young man, Thaddeus M. Halsted, who suffered so from rheumatism, was a doctor with an office in New York, and later became attending surgeon to the New York Hospital then at Broadway and Pearl Street. He wrote a paper on pulsating thyroid tumors. But it was William M. Halsted, Jr., who, after graduating as B. A. at Williams College in 1846, followed in the footsteps of his father and became the head of the firm of Halsted, Haines and Company. He seems to have been a rather rigid man of business who took to heart the principles impressed upon him in his youth by his father's letters and example.

He married his cousin Mary Louisa Haines, daughter of Richard Townley Haines, still further binding together the two families, and to them four children were born, William Stewart, Bertha (now Mrs. John T. Terry), Minnie (now Mrs. S. O. Vander Poel) and Richard. William Mills Halsted, Jr., became later a member of the Board of Governors of the New York Hospital and Bloomingdale Asylum, Member of the Board of Trustees of the College of

the City of New York and of the College of Physicians and Surgeons, New York, and Trustee of various charitable institutions. He was the founder of the Commonwealth Fire Insurance Company.

The Haines family were originally settled in Elizabeth, New Jersey, the town being named for Elizabeth Haines. There they lived a patriarchal sort of life about Elizabeth, occupying a great estate upon which it was their custom to build other houses for the sons and daughters when they married. One of them, Benjamin, had married Rebecca, a daughter of the Townley family, and from this union came Richard Townley Haines who became the partner of the elder William Mills Halsted, marrying Maria Ward Johnson, the sister of his wife. It was their daughter Mary Louisa who afterward married William M. Halsted, Jr. Maria Johnson, the wife of R. T. Haines, died and he then married Francina Wilder and had a daughter, Francina Evelyn, who married William Forest Halsey and became the mother of R. T. H. and J. T. Halsey, Miss Rosalie Halsey, Mrs. Stewart Paton and Mrs. L. F. Barker.

The Halsteds had their country house at Irvington, and Mrs. Paton tells of her visits to that house when she knew the young Halsteds so well. Dr. Halsted's father was particularly interested in his hothouses where he grew every kind of flower in profusion. This taste seems also to have run in the Haines family, for they had a wonderful collection of exotic trees and shrubs to which they were con-

stantly adding by importations. It is possible that Dr. Halsted's love for growing things came to him as an inheritance from both sides. Mrs. Paton recalls not only his father's strict adherence to the Presbyterian code of morals, which looked askance at the Episcopalian code in those days, but also his outbursts of parental authority visited upon the young William Stewart when he was discovered to have spent his time capturing frogs in their grounds and dissecting them. Possibly this was the very first sign of that interest in anatomy that grew so keen in later years.

II

EARLY EDUCATION. MEDICAL STUDIES IN NEW YORK AND EUROPE

In answer to the questions of Dr. Welch, who was preparing a memorandum on the life of Dr. Halsted to serve as an introduction to the volumes of his published papers, Dr. Halsted himself in the summer of 1922 wrote several long letters giving details which are hardly to be found elsewhere, and these may be quoted, with only such additions interspersed as throw light on years that he dismisses with a word or two. They describe especially the New York period, but his illness and death prevented his writing his recollections of the earlier days in Baltimore:

"Born on September 23, 1852, I was taught at home by governess until the summer of 1862. In the autumn of 1862 was sent to a private school at Monson, Mass., conducted by the Rev. Mr. Tufts (retired Congregational minister). There were about twenty boys in the school, all much older than I. I can recall very little of the method of instruction, but I must have studied Latin for I was given the choice of learning a lesson in Latin grammar or stirring soft soap in a great cauldron on Saturday afternoon when I was kept at home for misdemeanor, usually for swimming in the river. Sunday was a nightmare: we were driven to church two miles away and

spent the entire day in the churchyard—Sunday school from nine to ten or ten-thirty, church until 1 P. M., luncheon from basket, Sunday school again at 3 P. M. and church say from four to five-thirty. In the spring of 1863 I attempted to escape, walked to Palmer, four miles, took train to Springfield twenty miles; was captured at Springfield and taken back to Monson. Went to Andover in the fall of 1863 and graduated in 1869 (aged 16 +). Was considered too immature to go to college (undoubtedly true) and was placed in a private day school in New York for one year: also had a tutor for three or four months to revive my knowledge of Latin and Greek just prior to the examination for college."

He dismisses the Andover period without any further word and nothing could be learned from any records of that college, but the fact that he entered Yale without condition, as well as information from other sources, leaves no doubt that during those years of study he received that thorough drill in Latin, Greek and mathematics which enabled the Andover graduates, not always to their advantage, to absolve with little work the required studies of the Freshman year. Perhaps it was this thorough preparation for college which implanted in him that interest in the grammatical structure of language which remained throughout his life. At this period especially, the number of students entering Yale from Andover was large and they formed a distinct group in each class so that some of his closest friend-

Halsted as a boy, about 1868

ships dated from Andover and continued through college and life.

"Entered Yale without conditions in 1870 and graduated in 1874. Devoted myself solely to athletics in college. In senior year purchased Gray's Anatomy and Dalton's Physiology and studied them with interest: attended a few clinics at the Yale medical school."

At Yale, although he could easily have stood in the first division of the class as his classmates attest, he did not study and made a poor scholastic record. He paid little attention to his studies but gave himself up to athletics. Urged by some of his classmates, next term he set himself to work hard and really learned the subjects and answered the questions in the midyear examination correctly. Since he was sure of this, no report of the examination being made, he left the second division of the class where he had always been and for a time attended the classes of the first division. Surprised that his name was never called he presented himself to the instructor who asked him his name and then told him that he was in the third division.* After that he did not try any more, and although in due time he graduated it was without distinction. In his Freshman year he lived at 64 High Street and was a member of the Freshman Society, Delta Kappa and of the Fresh-

* This at least was the way in which Dr. Halsted used to tell the story in confirmation of his view that tutors do not change their estimate of a student's standing when they have once formed their opinion.

man Eating Club, the Tasters, at 420 Chapel Street. In his Sophomore year he roomed alone at 41 South Middle College and was a member of the Sophomore Society Phi Theta Psi and of a committee of eleven for the class supper of '74 at Guilford Point House, July 6, 1871. In his Junior and Senior years he roomed with Samuel Clarke Bushnell of New Haven in room 239 fourth floor of Divinity Hall. Both were members of the Junior Society, Psi Upsilon. During this year he was member of the class crew in the Barge race in the fall regatta on Lake Saltonstall, shortstop on the Class Baseball nine and one of twenty performers in the Yale gymnastic exhibition for the benefit of the " Yale Navy," an organization for the promotion of all sorts of boating. In his Senior year, 1873-1874, he was on the class crew in the Barge race and captain of the football organization, etc., and was also one of the seven members of the '74 French Club. He excelled in football and played in the game with Columbia on November 16, 1872, and through the football season of 1873. In that year football was reorganized at Yale and he was elected captain. The Yale library has no record of his having borrowed any books although he did borrow a few from the Brothers Library.

Even at this time, as one gathers from some of his contemporaries, he had a caustic wit which sometimes left a sting and it seems to have been this that moved two or three of the upper classmen to block his election to one of the Senior societies to which

many of his classmates considered him eligible on account of his general popularity, his prominence in athletics and class functions, and the appreciation of his talents by those who knew him well. He was greatly disappointed over this and embittered, but on looking back it would seem to us that he was not the chief loser. The Reverend Samuel Bushnell who knew him so well at Yale tells of his athletic prowess, the most notable game of football in which he figured being that with an eleven made up of graduates of Eton which Yale won 2 to 1, Captain Halsted making the winning goal. Though rather slight, he was exceptionally strong and well built and could handle a one hundred pound dumbbell easily. He was even then careful in matters of dress, yet could do the unconventional thing as when he appeared with another classmate on the campus one day in a tailor made suit of bed ticking. Judged by his subsequent career, with his immense capacity for hard work and close concentration upon the matter in hand, he could not have taken his college course seriously. He had a sense of futility as he looked back upon it. He thoroughly enjoyed it, but had given no evidence of unusual ability or of great ambition.

In college he read a great deal of classical fiction and French. He learned plays very quickly and acted very well, mostly in humorous parts. He was also interested in boxing and for a time went to prize-fights. He danced well but he did not go in for social activities, and he did not drink. He was

religious but he reacted against his father's type of Presbyterianism and took no particular stand.

When after his graduation at Yale in the summer of 1874 he came home to New York, he entered, in the autumn, the College of Physicians and Surgeons, registering with Dr. Henry B. Sands [1] as preceptor. Dr. Sands was then the professor of anatomy but was already active as a surgeon. Through the friendship of Dr. George B. Fowler, who was first assistant to Professor John C. Dalton,[2] he became third, then second, and finally first assistant to Dalton. Dalton was a most distinguished physiologist and Halsted was privileged to see much of him and to occupy his study at the school. Dalton's experimental work at that time was chiefly on cerebral localization (Ferrier's first publication had appeared about 1872) and on problems of digestion. There he imbibed much of Dalton's philosophy for which his reading in college

[1] Henry B. Sands, born New York 1830, died there 1888. M. D. College of Physicians and Surgeons 1854. From 1850-1870 partner of Willard Parker. Demonstrator of Anatomy College of Physicians and Surgeons 1856-1866, Professor of Anatomy 1869-1879. Since 1879 Professor of Practice of Surgery. Wrote on Aneurysm of Subclavian Artery treated by Galvanopuncture 1869.

[2] John Call Dalton, born Chelmsford, Mass., 1825, died New York 1889. A.B. Harvard 1844, M.D. 1847. Prize essay in 1851 on Corpus luteum. Worked on anatomy of placenta, physiology of cerebellum, intestinal digestion. Treatise on physiology. Professor of Physiology Long Island Medical College 1854-1855. In 1855 Professor at College of Physicians and Surgeons, New York, until 1883. In 1884 succeeded Alonzo Clark as President of the College of Physicians and Surgeons. Active as surgeon during Civil War. National Academy of Science 1864. Introduced teaching of physiology by experimental method.

Halsted in 1873 in the Class Baseball Nine

Halsted in 1874, upon Graduating at Yale

of Dalton and Huxley had prepared him, but most of his time was spent in dissection. For a time during the second winter he made some chemical tests in the office of Alonzo Clark,[3] at that time President of the College and Professor of Pathology and the Practice of Medicine and a leading consultant in New York. Through the summer of 1875 he worked in the pharmacy of the Centre Street Dispensary under a Danish pharmacist named Boege who took great interest in instructing him in the making of pills, plasters, elixirs, tinctures, ointments, etc., and made a large collection of medical roots and leaves. Here he knew Dr. Thomas A. McBride, who was physician in chief to the dispensary and who was an inspiration during that summer and always until his death in 1886.

Dr. Halsted's letter to Dr. Welch goes on: "In the early summer of 1876 finding myself rather overworked and unable to memorize normally, I went to Block Island to recuperate. The mornings and evenings were devoted to study but the afternoons to sailing and fishing. I promptly recovered my memory and on returning to New York in the autumn decided to take the examinations for Bellevue Hospital, although the ruling had just been made that only graduates were eligible. I had little hope

[3] Alonzo Clark, born Chester, Mass., 1807, died New York 1887. A. B. Williams 1828. M. D. College of Physicians and Surgeons 1835. Professor of Physiology and Pathology in College of Physicians and Surgeons 1848-1855, Pathology and Practical Medicine 1855-1885. Visiting Physician at Bellevue; Consulting Physician at St. Luke's and Roosevelt.

of success, knowing neither James R. Wood nor Loomis, whose men invariably won the first four places. My impression is that I secured fifth place and selected the 4th surgical division although I would have preferred the 2nd surgical on which Thomas A. Sabine was visiting surgeon, but this was chosen by Samuel O. Vander Poel who outranked me. Vander Poel had graduated the year before and failed to make Bellevue Hospital. I tutored him for nearly a year hoping that we might be internes together at Bellevue—and he stood second on the list and I fifth.

" As I have said I had little expectation of being admitted to Bellevue for I was ineligible, not having a medical degree, nor had I taken the cram quiz. I recall contrasting my physical condition with that of the other fellows who presented themselves for this examination. Most of them were pale and nervous having remained in town all summer for the cram quizzes. Some of them told me that they had been bracing up on strychnine and quinine during the hot weather. I had a fine coat of tan and was in perfect health. I cannot recall being nervous for I was taking the examination as something of a lark, knowing that I could try again in the spring.

" As interne at Bellevue I followed the medical work with quite as much interest as the surgical, making rounds with Janeway,[4] Loomis [5] and Jacobi,

[4] E. G. Janeway, born New York 1841. A.B. Rutgers 1860. M. D. College of Physicians and Surgeons 1864. Professor of Physiology and Pathologic Anatomy University of the City of New York 1872.

attending autopsies and spending much time in the medical wards: I assisted Jacobi at his surgical operations which were very, very amusing,[6] and became fairly well acquainted with Janeway. The surgical material was chiefly traumatic. Lister had just visited this country and his methods were enthusiastically adopted by Stephen Smith and Sabine[7]—not by any other of the surgeons at Bellevue. We had the opportunity to compare results and you can imagine the difference. Fortunately Frank Hamilton, Erskine Mason and Alex B. Mott, the surgeons of our division, made no objection to our attempts at antiseptic surgery. Hamilton's interest

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Professor of Materia Medica and Therapeutics Bellevue 1873, and Professor of Pathologic Anatomy and Nervous System and Clinical Medicine 1876. Visiting physician at Bellevue 1871

[5] Alfred Lebbeus Loomis, born Bennington, Vt., 1831. Student of Willard Parker. M. D. College of Physicians and Surgeons 1853. Visiting physician at Bellevue 1860. Adjunct Professor of Medicine University of the City of New York 1865, Professor of Pathology and Practice of Medicine 1867. An anonymous friend established the Loomis Laboratory. Wrote Textbook of Medicine.

[6] "The other medical men transferred the minor surgical emergencies which arose in their wards to the surgical departments, but Jacobi insisted on performing all such operations himself."

[7] "Thomas A. Sabine was at that time adjunct professor of anatomy at the College of Physicians and Surgeons. Stephen Smith who graduated at the College of Physicians and Surgeons in 1850 was professor of surgery at Bellevue Hospital Medical College. They followed Lister's technical formulae quite exactly. This technique was very simple except for the dressing to which Lister devoted his chief activity, impregnating dressings with antiseptics. Americans in general had no comprehension of the principles or possible future of antiseptics. Many New York surgeons gave it a brief trial but Boston and Philadelphia surgeons had no conception of it. It is safe to state that America learned antiseptic surgery from Germany and England from America."

was almost solely in fractures and naturally they became my main concern."

He goes on to speak of his own work at that time especially of the measuring, with George Munroe his first assistant, of several hundred legs, which showed that the left leg is usually longer than the right. His principal contribution during that period was the introduction of the hot bath in the treatment of infections, a method which has since been widely used with excellent results. He also devised a sliding apparatus to be used with Buck's extension in the treatment of fracture of the neck of the femur, a plan of treatment of fracture of the patella without operation, and several other mechanical appliances for use in the treatment of fractures, for example, the double roller with separate wires for weights making traction in fractures of the neck of the femur, an apparatus now universally used.

In the spring of 1877 came the examination for the M. D. degree in which he stood among the first ten. The ten honor men were invited to compete in a written examination for a prize of one hundred dollars. The examination was held in the amphitheatre of the college, each competitor being assigned a table in the pit: many student spectators occupied the seats. " The examining committee was composed of physicians not members of the Faculty. I recall that George A. Peters was one of these. We were allowed three hours. No questions could have pleased me better. Writing very rapidly and not observing the passing of time I devoted three hours

Halsted in 1877, as Interne at Bellevue

to the first—' The arteries of the neck.' Several of us requested more time and were granted half an hour.'' The name of the winner was not announced until commencement, but Halsted won the prize.

'' I cannot recall having learned anything from Mason or Mott. They were irregular in attendance and entrusted almost everything to the internes. But Hamilton came regularly and punctually, usually on a large iron-grey charger and equipped with riding boots and spurs. We became great friends and he confided to me his ambitions, disappointments and struggles and stressed constantly the satisfaction that original work would give. He was greatly distressed upon learning that he had been anticipated in his two contributions—new forms of splints for the treatment of fractures of the thigh.

'' In the late winter of 1877 the announcement was made that an examination would be held in the spring for the position of House physician to the New York Hospital, the medical wards of which had not been opened. I was urged by Dr. William H. Draper to compete and was given the position. Dr. Amidon, brother-in-law of Seguin, was my first assistant. The careful study of the nervous diseases by Amidon and Seguin [8] (whom we called in con-

[8] Edward C. Seguin was clinical professor of diseases of the mind and nervous system at the College of Physicians and Surgeons, and his library stood for years in the department of pathology in the building on Fifty-ninth Street. He was a warm friend of Thomas A. McBride with whom Dr. Halsted kept house, and later, when his wife killed herself and her children, they took him into their house for several months.

sultation) at the New York Hospital has been of enduring value. Dr. Charles Knight had inaugurated the surgical service six months earlier and we pulled well together, my interest in surgery being maintained. It was customary at that time for the prominent surgeons of New York, particularly those affiliated in some way with the P. and S., to assemble at the surgical clinics to occupy the front seats reserved for them, to be consulted and often asked to assist at the operating table. Indeed it was the privilege of the visiting surgeons to assist if they desired to do so.

" Draper, Charles I. Hackley and Woolsey Johnson were the visiting physicians, George Peabody, pathologist, Ferguson ' diener ' in the autopsy room. Dr. Draper was most friendly, inviting me frequently to his house, to musicales on Sunday afternoon and to dinner. Hackley [9] impressed me with his mod-

[9] " Dr. Hackley, recalling later my eagerness to operate early in cases of perityphlitis, assigned to me in the early eighties two private patients with acute general peritonitis. Assisted by Richard Hall I removed the appendix promptly in each case, but with fatal result. These were the first appendectomies performed in New York. Fitz's paper appeared a few years later (1886). Hall reported subsequently a successful appendectomy, the first in the country. He was operating for the relief of an ' inflamed hernia ' and found the inflamed appendix in the sac. The main surgical topic with Sands, Hall and myself in the early eighties was perityphlitis. We (Hall and I), unable to secure a patient, urged Sands constantly to operate and remove the appendix as soon as possible after the appearance of symptoms. The early cases were only seen in private practice of which I had none. McBurney in his first paper (1889) states that he assisted Sands in performing six appendectomies prior to his own

esty and learning, and Woolsey Johnson as being overcome by the heat."

While in the New York Hospital as House physician, Dr. Halsted devised a new design for the hospital temperature charts with dots instead of lines, condensing the figures for temperature, pulse and respiration on the side lines and tracing the curves in different colors. It is the one still in use in many hospitals and in all the services in the Johns Hopkins Hospital.

It was apparently at this time (during the summer of 1878) that he first made the acquaintance of Dr. Welch who had just returned from Europe but since Dr. Halsted sailed for Europe in the fall of that year they did not meet again for some time.

"In the fall of 1878 I sailed for Europe. Sam Vander Poel, who had been in Germany for six months, met me in Paris. The first morning we were invited to breakfast at Foyot's by friends of his from California who nominally had been studying medicine in Paris for two years. We asked to be taken to the Ecole de Médecine by these gay birds, who told us that they had not been able to discover it, considering it a hard day's work to go to the bank. Under guidance of this bevy we learned a few things in twenty-four hours about Montmartre and then took train for Vienna, arriving there November

operations. If Sands had lived he would undoubtedly have anticipated McBurney but this does not detract from the great credit due McBurney for early diagnosis and operation in the interval."

fourth. We fell in with pleasant Americans the first day—Jack Elliot, Harry Morse and Jim Minot, all of Boston. I began by taking German lessons, two daily from two teachers, one before breakfast, and attended courses all day, with Chiari in pathology, Fuchs and Arlt in diseases of the eye, Pollitzer and Gruber, diseases of the ear, Kaposi and Neumann, skin diseases, and with Pawlik in gynæcology. But anatomy was my chief work with Zuckerkandl and Holl as my teachers. Soon after my arrival I was asked to treat the former for a painful surgical affection and thereafter was invited to do all my dissecting in his private room to which no one else was admitted. Undertook the task of dissecting the finest demonstrable anastomoses of the nerves of the orbit, using dilute alcohol to dissolve partially the fat, but abandoned it on finding that Bochdalek had pictured everything conceivable in the way of anastomoses. Zuckerkandl assured me that he must have imagined them. The abundance of fresh material was a delight and it was shamefully wasted, in our room at least. It was a revelation to see how easily and quickly the otic ganglion might be exposed.

"Attended the clinics of Billroth and Braun and for a brief period the lectures of Meynert. Persuaded Meynert to give me a private course in the dissection of the brain at six A. M., but as he was always in bed on my arrival and the lesson was given in his unsavory bedroom I soon released him from the contract. My work in embryology with Schenck was

chiefly valuable because it led to friendly relations with Woelfler who was first assistant to Billroth, Mikulicz being another. Woelfler and I dined together frequently and he gave me unrestricted entrée into the surgical wards. It was never difficult to find seats in Billroth's small amphitheatre. He had not yet performed his first resection of the stomach and I cannot recall having seen an operation for goitre. What impressed me chiefly was the magnitude of the operations and the skill of Billroth and his assistants, particularly Mikulicz, and the great number of artery forceps used.

" I began Exner's course in histology, but had not time to continue it. By the end of the first Academic year I had reached very friendly terms with Holl, Professor Lange's second assistant, afterward Professor of Anatomy in Graz. Throughout the second winter we worked together on many evenings on the anatomy and comparative anatomy of the brain, using Schwalbe as our chief textbook. This labor proved fruitful a few years later when I was unexpectedly called upon during Sabine's illness to take his place at the college. I gave thirteen lectures on the anatomy and embryology of the brain and spinal cord. You will recall that the entire subject of the central nervous system was, in our days at the school, covered in one brilliant lecture by Sands who quoted Gray almost verbatim.

" Leaving Vienna in the spring of 1879, I went to Würzburg to take a course in embryology with

Kölliker and histology with Stoehr and attended regularly the clinics of von Bergmann.

" My stay there was shortened by the arrival of my parents and sisters at Liverpool in the early summer. Sam Vander Poel travelled about with us during the summer and became engaged to my sister Minnie.

" I returned to Vienna in the autumn of 1879 and was joined there by George Dixon and McPhail. Dixon and I took rooms together in an apartment occupied by a widowed mother and her two daughters in the Piaristengasse. We took our suppers with the family for the sake of conversation in German. Our midday meal was taken in the bosom of a Lutheran minister's family consisting of wife, son and three daughters. One of the daughters fell desperately in love with Dixon.

" The second winter was in some ways more profitable than the first because I understood the language and had become better acquainted with my teachers. Dixon's attractiveness involved us in many social festivities. During the Easter vacation we went to Italy for ten days and Dixon made conquests all along the route. In Naples we stopped at a nice little hotel (Lady Washington) near the beach and were invited on the first night to the young landlady's box at the opera—a gala performance. Soon after the holidays (spring of 1880) I deserted my gay friends and left Vienna for Leipzig. There Weigert received me cordially on your account.

Probably you (Dr. Welch) gave me a letter of introduction. We went to the opera and theatre together a few times. Huber was roped off as in your day, but helped me a little in my effort to learn something about tumors; but tumors proved an uninteresting theme without patients or clinical histories. However I made a collection of slides and brought them home with me. I enjoyed the clinics of Thiersch, although his operations were generally minor ones. Wagner's clinics I attended also.

" My sojourn in Leipzig was not as profitable as I had hoped chiefly because soon after my arrival there came a telegram from McPhail and then McPhail himself, ill with typhoid fever contracted in Rome. Wagner at my request took personal charge of him and was very kind and attentive. McPhail became very ill and one morning, full of apprehension, I received word from his nurse that his temperature was ninety-five and his pulse two hundred. He looked however much improved, so I took his temperature and pulse and found both approximately normal. It seems that the nurse had no watch and her minute was the time required by McPhail to count sixty in German. This was a feat beyond his powers and I have never understood why the nurse stopped counting at two hundred.

" When Dixon also appeared on the scene I fled to Halle where with Volkmann I spent several profitable weeks. Volkmann invited me to his house several times and I found Frau Volkmann quite charming—

she spoke English fluently. From Halle I went to Berlin, then to Hamburg where I saw Schede and to Kiel, where Esmarch was active. After that I returned via Paris and London to New York early in September 1880."

These two years spent in Europe from the autumn of 1878 to that of 1880 must have been very stimulating and broadening to the young man who had seen nothing of the world of medicine before, except his work as interne in Bellevue and the New York Hospital. He was fortunate in that it was a time of great activity when revolutionary things were occurring in so many different fields of science. Bacteriology was at its dawn, embryology and histology were just becoming clear. Pathological anatomy was being studied with a new vigor and understanding and antiseptic surgery was new and in process of development, more by the German surgeons than anywhere else in the world, although it had begun with Lister in Scotland and later in England, where the British surgeons refused it. Lister's disciples and students were almost all foreigners. He was fortunate too in coming so intimately in contact with the best men of that day—men whose names are familiar still as the pioneers in their fields. Medical men will forgive such details as too common knowledge, but a word about some of these personages may not be entirely out of place.

Billroth, the chief surgeon, was distinguished in all Europe for his skill, his resourcefulness and initi-

ative in the operative treatment of disease. Wölfler is best known for his work on the thyroid. Mikulicz, afterward professor of surgery in Breslau, ranked in later life as one of the foremost of European surgeons. Like Billroth he was an accomplished musician. Kölliker was even then an old man. His textbook of histology is still a standard work and so is that of Stöhr. Weigert, who was then assistant of Cohnheim at Leipzig, moved later to Frankfurt, where he died not long ago. He was famous for his work on the pathological anatomy of diseases of the central nervous system and for many technical methods. He was a great friend of Dr. Welch. Huber, described as "roped off," was a curious German soul—there was no separate room for him in the laboratory so he stretched a rope about his work table. He paid no attention outside the rope and was furious if anyone attempted to approach him without first knocking on the rope when he would call out in stentorian tones, "Eintreten." After that ceremony everything went smoothly. Thiersch was the surgeon whose name is commonly associated with skin grafting, although Frank Hamilton of Bellevue described and preached it long before. Von Bergmann of Würzburg was afterward the most prominent surgeon in Berlin, and Volkmann of Halle, Schede of Hamburg and Esmarch of Kiel were also surgeons of renown. Their names are especially associated with the Volkmann splint, Schede's treatment of varicose veins and Esmarch's bandage for

rendering a limb bloodless, but these were by no means their chief contributions. In the introduction and development of antiseptic surgery in Germany the great name is Volkmann, and Dr. Halsted must have gotten ideas and inspiration from him. Koenig, writing in 1877, says: "With joy we see how our attitude toward the patient has changed. Heart and hand are no longer tied by the fear that operation may be fatal through accidental infection. The coming generation will perhaps know only from the records of long past times of the doubts and difficulties of surgeons as to whether this danger may not be so great as to forbid the healing operation. It is Joseph Lister who has set us free from this fear and allowed us to extend our operative activity in an undreamed of way." This, it seems, gives some idea of the state of mind of the surgeons of that time. It was as though they were suddenly set free to explore a boundless field with the consciousness of bringing healing to their patients with a new safety. That they overestimated their blessings a little, diminished in no way their sense of security.

III

LIFE IN NEW YORK: ACTIVITY

Dr. Halsted's letter to Dr. Welch goes on:

" On my return to New York in September 1880 Sands urged me to become his associate at Roosevelt, where he had, through the resignation of Weir, a continuous service. He was remarkably kind and generous to me, permitting me to operate on anything that particularly interested me and to dictate the technique of the clinic. To me was entrusted the purchasing of instruments from abroad for the Hospital. He was amused to find twelve artery clamps listed in one order and asked, ' What shall we do with so many? '

" He warmly supported my proposition to start an outpatient department and the basement that carried water and gas pipes was put at my disposal. It must have been in the autumn of 1880 or early spring of 1881 that we inaugurated the work in the dispensary. Hall, Hartley [10] and Frank Markoe [11]

[10] Frank Hartley. M. D. College of Physicians and Surgeons 1880. Served as interne at Bellevue and studied in Europe. In 1885 he became assistant demonstrator of anatomy in the college, demonstrator in 1889, lecturer on operative surgery there and assistant surgeon at Roosevelt Hospital in 1885. It was then that he was intimately associated with Dr. Halsted and assisted in his quiz. Later in 1901 he became Clinical Professor of Surgery at the College of Physicians and Surgeons. He died in 1913.

[11] Francis H. Markoe. Born in New York 1856, the son of Dr. T. M. Markoe. Graduated at the College of Physicians and

were my chief assistants and we spent every morning there, Sundays included. Sunday was devoted to the treatment of gonococcal infections and we studied the effect of various weak corrosive sublimate solutions by counting the gonococci from day to day. The results were astonishingly good and I am not sure that this is not the best treatment known today, although it is being abandoned for others less troublesome to apply.

" The Roosevelt Trustees were soon convinced of the value of the outpatient work and in about one year erected a suitable building with provision for a medical department also. West Roosevelt was made physician to the medical half of the dispensary. G. E. Brewer joined our staff at about this time.[12] It was my boast that I had not missed a day from the dispensary duty until the spring of 1884 when I sailed for Europe to attend a congress of the Deutsche Gesellschaft für Chirurgie.

Surgeons in 1879. Served as surgical interne in the New York Hospital, studied for a year in Europe. Became assistant demonstrator of anatomy in 1880 and demonstrator in 1884. From 1881-1887 he was connected with the outpatient department of Roosevelt Hospital and in 1887 became attending surgeon to Bellevue and later to St. Luke's and New York Hospitals. He became distinguished for his skill as an operating surgeon.

[12] In 1922 Dr. Brewer writes: "I remember with great pleasure the early days in Roosevelt Dispensary and I can truthfully say that no group of men ever worked more conscientiously, more successfully or with more esprit than the outpatient staff of that hospital. When I first became associated with them the atmosphere of the place and the spirit of the individual men stimulated enthusiasm and our daily consultations over obscure cases were most illuminating and helpful."

"Volkmann greeted me warmly and nominated me for membership in the Society, von Langenbeck seconding the nomination. Volkmann was tall, slender and animated, had reddish hair and wore flowing Dundreary whiskers and long mustache. His costume at the first morning séance of the congress I recall vividly—swallow tailed coat, white silk waistcoat bespangled with embroidered flowers, soft white shirt, flowing bright red artist's tie and Scotch plaid trousers. He was a forceful, logical and picturesque speaker—a genius and also, as you know, a poet."

Upon his return to New York in the autumn of 1880, Dr. Halsted, full of enthusiasm over his new work in the Roosevelt Dispensary and in the department of anatomy in the College of Physicians and Surgeons, organized a "quiz" which was to be different from the cramming quizzes so long popular in New York. Of it he writes:

"It began with the opening of the school in the fall of 1880. Sabine sent me the first three students, two of them Cubans. They paid me one hundred dollars each, in advance, at the first interview. I felt like a robber. George Munroe was associated with me in the enterprise for only one year. We took only college graduates from this time on. Tuttle [13] and

[13] George Montgomery Tuttle. A. B. Yale 1877. M. D. College of Physicians and Surgeons 1880. Was interne in medicine in the New York Hospital in 1880 and was appointed Physician in Chief to the State Emigrant Hospital on Ward's Island where he remained from December 1881 to March 1883. He accomplished great reforms in that institution and became assistant in obstetrics and gynæcology

Frank Hartley, Gilman Thompson[14] and West Roosevelt[15] were with us until the quiz disbanded. You (Dr. Welch) of course were the main asset.* We had eventually about sixty-five men in the quiz, almost all of those in the school who had the A. B. degree. These students were taken daily to the hospitals or dispensaries and had recitations regularly. They were given a laboratory course in chemistry at Columbia by Tim Cheesman's brother. Thompson gave, I think, a laboratory course in physiology. On graduation from the College of Physicians and Surgeons our men invariably carried off the honors. In the first twelve we usually had as many as ten. Very few of the lectures of the college were attended by our men, as they had a set of notes which sufficed year after year."

It seems that in this letter, written in 1922, Dr. Halsted had confused the dates and the order of events a little, for Dr. Munroe was good enough to recall the story of it later. He with Dr. Halsted and William H. Flint, a distant relative of

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in the College and after study in Europe was appointed in 1885 Professor of Gynæcology. He died October 29, 1912.

[14] W. Gilman Thompson. Ph. B. Yale 1877. M. D. College of Physicians and Surgeons 1881. Held various chairs in New York University Medical College 1887-1898. Professor of Medicine Emeritus, Cornell University Medical College. Died 1928.

[15] James West Roosevelt. M. D. College of Physicians and Surgeons 1880. Became lecturer in clinical medicine Columbia College 1886. Died April 10, 1896.

* This refers to the courses in normal and pathological histology given to many of these students by Dr. Welch in his laboratory at the Bellevue Hospital Medical College.

Austin Flint, started it in 1880. One of their first students was Gilman Thompson and quite a number of their other students attained distinction. This quiz went along successfully for several years, Dr. Halsted teaching anatomy and surgery, Dr. Flint physiology and some other branch, and Dr. Munroe the practice of medicine, materia medica and gynæcology.

Later Halsted left this group and joined or formed another which included George Tuttle, West Roosevelt and others, while Drs. Munroe and Flint continued their quiz for several years. Ellsworth Eliot was one of them and shortly after they ceased their activity he started his quiz on about the same lines and this had a long and successful career.

But Dr. Arthur Purdy Stout, who in 1924 read a paper on the early New York period of Dr. Halsted's life before the "Halsted Club," gives the best picture of this situation, and this may with his permission be quoted. He had talked with six of the contemporaries of those early days—Drs. Thomas S. Southworth, Samuel W. Lambert, Ellsworth Eliot, Jr., Lucius Hotchkiss, George E. Brewer and George Munroe who remembered it all very clearly.

> For the benefit of those who are not familiar with the characteristics of medical education in those days it will not be amiss at this point to tell something about it as it existed at the old College of Physicians and Surgeons.
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> The catalog states that "Candidates for the degree of Doctor in Medicine must have attended two full courses of Lectures—the latter in this College. They must have studied

medicine three years under the direction of a regular physician or surgeon; have attained the age of 21 years and be of good moral character." They have also to write a thesis and pass a satisfactory examination before the College Faculty on the seven branches of Medical Science taught in the lectures. These were—Anatomy, Physiology and Hygiene, Chemistry and Medical Jurisprudence, Materia Medica and Therapeutics, Obstetrics and Diseases of Women and Children, Surgery, and finally Pathology and Practical Medicine. Attendance at these didactic lectures was compulsory and examinations were based upon them. There were also clinics held at many of the hospitals about the city, but attendance at these was optional.

But this college work was more or less of a farce—no student expected to get more than his M. D. from the Medical School—he got his real training from two sources, his preceptor and the private quiz. Every student had to be registered with a preceptor who must be a regular physician or surgeon—this practically amounted to an apprentice system and naturally much depended upon the ability of the preceptor as a teacher and inspirer—and the young graduate's future might be assured if his preceptor was a person of influence.

The private quiz was a peculiar institution and took the place of the conferences and quizzes which exist today in the Medical School itself. From three to six doctors would associate themselves under the leadership of the most prominent member and invite the medical students to recite to them by heart the various subjects which they studied. They covered pretty much all the subjects contained in the curriculum. It really amounted to an exploitation of the medical students, for the quiz masters were usually faculty members and we have the strange picture of the faculty members of an institution advising their students not to pay any attention to the curriculum but to go outside to a private quiz—and usually the faculty member who gave the advice was running a private quiz himself. Medical education was an expensive business

even then for a student—he had to pay annually $140 for his lectures, $100 for the private quiz, besides matriculation fees and incidentals.

The members of the Medical School Faculty at the time Dr. Halsted was a student included a number of outstanding names such as Alonzo Clark, the President of the College, Willard Parker, Francis Delafield, William H. Draper and Abraham Jacobi. In anatomy and surgery besides Sands and Parker were Thomas M. Markoe, T. Gaillard Thomas and Charles McBurney.

Those who knew Halsted at this time remember him chiefly as a bold, daring and original surgeon, an indefatigable worker and most of all as an inspiring teacher. He taught anatomy at the Medical School, anatomy and surgery in his private quiz, and surgery Sunday mornings at the Roosevelt Dispensary. Dr. Sam. Lambert recalls him as of "moderate height, slight figure, with a beard and prominent ears." Dr. Hotchkiss writes "I remember him distinctly as a demonstrator of anatomy, seeing him walk through the dissecting room, distributing the parts and helping the students with their work. He appeared tall, slim, very bald and very near-sighted." Dr. Ellsworth Eliot says he "was accustomed to make hurried rounds (in the dissecting room) in his shirt sleeves and wearing a high hat."

But it was in his private quiz that he made the deepest impression on his students. He had two quizzes—the first one from 1880-1883 with Flint and Munroe and the second and more famous one from 1883-1886 in association with George M. Tuttle, William Gilman Thompson, Charles Pellew and his classmate J. West Roosevelt. This second quiz was held in his offices in Twenty-fifth Street. Dr Thomas S. Southworth was a student in it in 1884. He says: "Dr. Halsted was an ideal teacher and absolutely at home in his familiarity with his subject and the textbook 'Gray's Anatomy.' It was the natural desire of the brighter minds among the students of the quiz

to catch him napping upon some point. Finally at one evening quiz the moment seemed to have arrived, for a student, corrected on some minor point, respectfully held his ground and appealed to 'Gray.' Gray was consulted and confirmed the student's version. The day seemed won, when Dr. Halsted said, 'Wait a minute, I am sure Gray gave it my way in the edition I studied,' and reaching for a worn copy of his student days, showed that his recollection was correct. If the crowd did not cheer him, there was the equivalent, for we took an immense pride in our quiz and its teachers." Dr. Hotchkiss says: "He was always ready to help the boys with their work and was very pleasant with them, using on occasion his well known little ironic method with which we were all familiar in our student days and which served to keep perfect order in his quiz classes. He held a wonderful quiz in anatomy at his offices where he had a large number of anatomical preparations both dry and wet, notably a splendid collection of brains hardened in alcohol and sectioned for study. He required his men to carry anatomy through three years of the college course, regarding it of great importance." Dr. Eliot says: "He was an omnivorous reader, an unusually close student of surgery and an excellent anatomist. He was highly regarded by his individual students although he had the habit of spending an entire hour on some trifling part of the subject lesson."

This quiz seems to have been conceived in an entirely different spirit from those which preceded it and which were devoted practically to learning by heart, with catchwords, certain favored portions of the required textbooks and preparing particularly to answer the type of question that certain examiners were known to ask, in the particular way in which they were known to approve of the answer. Thus if Loomis were the examiner you answered in one

way, if Flint, in another. Instead actual practical work in laboratories and wards with patients was afforded these students and the conferences and recitations, generally held in the house on Twenty-fifth Street, where Dr. Halsted lived, must have been inspiring because of the close contact with such an eager enquiring soul as he was. It was a particular privilege, for which Dr. Halsted was always grateful, that the students of his quiz were accepted for special instruction in pathology by Dr. Welch who was at that time a member of the faculty of Bellevue Medical College, and had a wonderful autopsy material to show them.

But this was only a part of Halsted's activity during this time, for he had his college duties as well as the much heavier responsibilities in connection with several hospitals. It is astonishing that he could have compassed so much work. It is desirable to recall at this point something of the status of the educational institutions and hospitals of New York at that time.*

Kings College, afterward Columbia University, was founded in 1754, and its medical school was established in 1767 with six professors, including Samuel Bard, and was continued until 1813. The College of Physicians and Surgeons had been organized in 1807 and began in a house in Robinson Street, now Park Place. In 1814 the medical faculty

* History of Columbia University, 1754-1904. Columbia University Press, Macmillan 1904.

of Columbia College was absorbed by the new College of Physicians and Surgeons, thus increasing the strength and prestige of that school. Among them was the distinguished surgeon Valentine Mott. The college moved to Pearl Street and then to Barclay Street and later in 1837 to Crosby Street. Willard Parker became the surgeon during these years and under the presidency of Alexander H. Stevens, from 1843 to 1855, Alonzo Clark and John C. Dalton joined the group. About 1856 the college moved to Twenty-third Street at Fourth Avenue, and Edward Delafield became its president in 1858. In 1860 there came a new alliance with Columbia College, each institution retaining its own autonomy, but the College of Physicians and Surgeons was thereafter officially the Medical Department of Columbia College. In 1887 the college moved from Twenty-third Street to the new buildings in West Fifty-ninth Street, where the Sloane Maternity Hospital and the Vanderbilt Clinic had also been built, and in 1891 the College of Physicians and Surgeons was inseparably united to Columbia University, transferring its property to the Trustees of Columbia College. The New York Hospital had been begun in 1771, but not opened until 1791. The students of Columbia College and later of the College of Physicians and Surgeons were allowed to attend the hospital practice there. The same privileges were available at the Almshouse in Chambers Street in 1807. Bellevue, established in 1816, offered such facilities somewhat later in 1849,

but the Lying-in Hospital gave these privileges from the beginning of the century.

Bellevue Hospital in the 1880's was a great rambling structure not much like the splendid buildings which stand on that ground now although some of the old ones are still there. Bellevue Hospital Medical College was on the same ground and had the same relations with the hospital as the other medical schools. It controlled the Third Division, and with that Dr. Welch was associated as pathologist.* Later it disappeared or was merged into the Medical School of New York University. The pathological work was carried on in the old morgue on the East River over which was the Wood Museum and a few rooms.

The Charity Hospital on Blackwell's Island is now the City Hospital—a very large institution with a great number of patients drawn from the poorer classes. The Emigrant Hospital on Ward's Island was a large hospital maintained by the State for the care of immigrants who were brought in ill from the ships. Dr. Tuttle and Dr. Allen M. Thomas served there for several years until the hospital was abandoned as a State philanthropic institution and was transferred as a federal institution to Ellis Island.

The Chambers Street Hospital, which was largely under the control of Dr. William T. Bull, who was surgeon in chief, is a hospital for emergency cases

* Dr. Welch was appointed pathologist to this division in 1878 and subsequently was made pathologist to the whole hospital.

such as accidental injuries and poisonings and serves the downtown districts. It is of relatively recent origin and not a continuation of the old Chambers Street Almshouse.

Immediately upon his return from Europe in September 1880 Dr. Halsted was made assistant demonstrator of anatomy in the College under Henry B. Sands, the Professor of Anatomy. William Tillinghast Bull was demonstrator and resigned in his favor the following year. This place he continued to fill for four years and many recall his work there. Sands was an extremely busy surgeon besides holding the position of Professor of Anatomy, and had little time to devote to the dissecting room. For his lectures and demonstrations a careful dissection was prepared by the prosectors and at this he merely glanced. Thomas A. Sabine, the adjunct Professor of Anatomy, was quite different in this respect. He had little surgical practice and was intensely interested in all the details of anatomy and dissected eagerly with the prosectors to clear up disputed points and to throw light on the newer discoveries in anatomy. In this close companionship he exercised a great influence on both Dr. Welch and Dr. Halsted. Indeed on account of his failing health he took a trip to Jamaica in the spring of 1883, and Dr. Halsted went with him. Sabine died not long afterward of tuberculosis.

In 1881 or 1882 Dr. Halsted was appointed Visiting Physician to the Charity Hospital on Blackwell's

Island and in the next year became Surgeon in chief to the Emigrant Hospital on Ward's Island.

He writes: "My visits to the Charity Hospital and to Ward's Island had usually to be made at night, for few hours by day were unoccupied. The Ward's Island service was a splendid one. George Tuttle was resident physician and Allen M. Thomas obstetrician. Thomas reduced the mortality of child-bearing from twenty-five or thirty per cent to one-half of one per cent. The internes in the Charity Hospital used to save up the surgical operations for me, calling them emergencies, for my night visits, although nominally I was Visiting Physician."

The records of the Roosevelt Hospital print Dr. Halsted's name as Attending Surgeon to the out-patient department from 1883 to 1886, and as Assistant Attending Surgeon from 1882 to 1886. It is clear, however, that he was at work there organizing the new outpatient department in the autumn of 1880 and it was there that he did his best work, especially in the treatment of venereal disease.

He was appointed Visiting Physician to Bellevue probably in 1883. "Finding it impossible to carry out the proper technique in the amphitheatre operating room I petitioned the Commissioners of Charities and Correction for permission to erect an operating building for my sole use in the Hospital enclosure. They were sympathetic but unable to comply with the request because prohibited by the terms of their charter or something of the kind. Then I suggested

a *tent,* and to this they consented. My friend Steub, church architect and church decorator, designed the tent and supervised its construction. George Dodge contributed and my brother. The tent cost about ten thousand dollars. It was a beautiful tent and fulfilled its purpose admirably. The floor was of maple laid almost as finely as a bowling alley and sloped for drainage to a gutter about the great pole in the center. Large and numerous portholes provided ample light. Water, hot and cold, and gas were piped to the tent and patients were rolled from the wards to the tent on a platform. Unfortunately, it was used for only a few months, as I left New York soon after its completion."

About the same time, 1883, he was appointed to the Visiting Staff of the Presbyterian Hospital, just after the great upheaval when all the surgeons except Stimson and Briddon resigned. "Thus the surgical staff was reduced to three. Stimson and I, good friends before, became warm friends thereafter. Briddon received me cordially; his son had already registered with me as preceptor. But unfortunately Briddon wished to assist at all operations, and as he had no conception of antiseptic technique and could not learn it, he left the amphitheatre in a rage one day because in the course of an operation I had requested him several times to be more careful and to disinfect his hands. Thereupon he withdrew his son from our quiz, but ultimately the breach became healed and I think the son returned to our fold."

"In addition to the hospitals mentioned," he writes, "I had the summer service at the Chambers Street Hospital, thanks to William T. Bull who was surgeon in chief. The traumatic service was very heavy—night and day. It was at Chambers Street that I made the experiments in 'refusion' of blood. We received many cases of illuminating gas poisoning chiefly from the night boats on the Sound and Hudson River. These were the first and I think the only centripetal arterial transfusions on the human subject." This was an interesting contribution to the lifesaving process of transferring blood at a time when nothing was known of the incompatibility of the blood of different groups of people, but in this case it was the patient's own blood shaken with air to free it from the poisonous carbon monoxide, which was driven back into an artery and not into a vein, and against the stream rather than with it so that it might mix with the other blood and not result in gangrene of the extremity by causing constriction of its arterial branches. This is not the place to discuss the value of such a procedure, and indeed Dr. Halsted found that the bleeding alone went far to restore the patient. He had occasion to practice real transfusion of blood once, in 1881, when he arrived by chance in Albany when his sister, after the birth of her first child, suffered a great hæmorrhage. He was summoned to the bedside and found her ghastly white, pulseless and almost unconscious. "After checking the hæmorrhage I transfused my

sister with blood drawn into a syringe from one of my veins and injected immediately into one of hers. This was taking a great risk but she was so nearly moribund that I ventured it and with prompt result."

"A year later I was summoned to Albany one evening by telegram to see my mother, who for two years or more had been ill with an undiagnosed affection. She was in McBride's care and had been seen in consultation by Janeway, Sands, Delafield, and, I think, Draper. I found her very ill, slightly jaundiced, with tumefaction and great tenderness in the region of the gallbladder. So at two A. M. I operated, incised the gallbladder which was distended with pus and extracted seven stones. This was, I think, one of the earliest operations for gallstones in the country. My mother died about two years after my operation."

These recollections serve at least to throw a little light upon his courage and the skill he had already acquired—and here his fifteen written pages of autobiography end, so that we can hardly come so close to the next years of his life. But through these years in New York, from 1880 through 1885, he worked with superhuman energy and with the strength and endurance of ten men. One can perhaps imagine the extent of his task with the outpatient department of Roosevelt occupying the morning, five other hospitals demanding his services in the wards and operating room at any time, and especially at night, with regular hours of teaching in the dissect-

ing rooms at the College and with his quiz of sixty-five or more students at his house. What leisure he could ever have had with this programme it is hard to tell.

During these years he kept house with Dr. Thomas McBride [16] in a house on Twenty-fifth Street, between Madison and Fourth Avenues. His father and mother lived still in the old house on Fifth Avenue at Fourteenth Street, but they also had, until his mother died in 1883, the house at Irvington on Hudson, where he had spent some of his earlier life. That is always spoken of as a pleasant place. But during his years of hospital work he seems to have spent little time in social diversions. He and Dr. McBride seem to have taken great pleasure in their house which was luxuriously furnished and really, in a way, they kept open house, for a number of men used to drop in there to dine whenever they felt so inclined. Dr. Welch was one of these and always welcome. He remembers the conversation as very vivacious among the five or six friends he commonly found there. Whether they were friends

[16] Dr. Thomas Alexander McBride. A. B., M. D. College of Physicians and Surgeons 1871, was several years older than Dr. Halsted. He was lecturer in Columbia College on Symptomatology from 1876-1880, Examiner in Pathology and Practice of Medicine, Clinical Assistant in Diseases of the Mind and Nervous System. He died at sea August 31, 1886 (Shrady). McBride was a handsome, attractive fellow who was one of the clinical assistants at the College and who acquired an extensive practice. He made a great deal of money and spent it lavishly. To him Dr. Halsted always felt that he owed a great deal.

of McBride or of Halsted he hardly knew, but some of them were stockbrokers or architects or young men in some other professional calling.

Mr. Allen Wardner Evarts has been good enough to write his recollections of Dr. Halsted at this period.

I first made the acquaintance of Halsted about 1883. He was three or four years my junior and graduated at Yale five years after me but we had many common friends and acquaintances. At the time we first met he and a Dr. McBride (a successful practitioner of medicine who gave promise of distinction but died comparatively young) kept house together in handsome fashion in Twenty fifth Street just round the corner from the University Club then at the corner of Twenty sixth Street and Madison Square. The club then recently formed was frequented by men from twenty five to fifty years of age to a large extent acquainted with one another. Halsted, though as a rule dining at home, was much at the club in his leisure time and I recall him as often in the bowling alley, tenpins being at one time very popular.* I don't think that he ever played cards. His house was a very hospitable one and frequently one or two or three would be asked to come around to dine at their well appointed and well supplied table which seemed always to have provision to welcome a chance comer. For the four years we were thrown together in this circle of friends and familiar acquaintances I gained an intimacy with Halsted perhaps as great as could be expected between busy men of our age. My recollection of him is that he was a delightful companion of gay and cheerful disposition, kind heart and agreeable and cultivated manners and that he was seriously devoted to his profession.

* Dr. Halsted enjoyed this game and was extremely skilful, indeed he had in New York a great reputation as a bowler, but he never practiced it after coming to Baltimore.

One of the amusements of those days was the formation of an association to have a male quartet give a concert at Halsted's house during the winter season on Sunday afternoons, which kept up for two or three years. Halsted invited me one night to go with him to the hospital (Bellevue I think) and I saw him perform two operations, one an abdominal one, and though I was not perhaps qualified to judge, I greatly admired the skill he displayed. I recall his giving me an injection of cocaine when that drug was first attracting attention and was being experimented with.

I haven't given you any facts or details such as you are desirous of having but I have racked my memory and this is all that I can produce. I saw little of Halsted after he left New York—very infrequently and briefly and casually when we did meet.

IV

LIFE IN NEW YORK—THE DEVELOPMENT OF COCAINE ANÆSTHESIA

These years in New York might seem to have been filled to overflowing with hurried routine hospital duties, and were unfamiliar to most of us. But all of his published papers have been collected and republished in two large volumes by the Johns Hopkins University Press, and it is important to realize, from reviewing his early work, a fact that is so unwelcome to those still in the prime of life, that his best thoughts and the germ of his later work, if not much of the actual material of his best later publications arose in this early period. It is quite true that he elaborated all these themes in later life and maintained his enthusiasm and energy to the last, but his brilliant achievements, especially his conception of the treatment of tissues in the technique of operation and in general of the reaction of tissues to artificial interference date from that period.

The two great dramatic advances in surgery, the introduction of anæsthetics by Long, Morton, Simpson and others, and the invention of antiseptic surgery by Lister, had created a sensation long before, but although ether and ether anæsthesia seem to have been accepted readily enough, antiseptic sur-

gery was still meeting with opposition and disbelief and most of the surgeons neglected or ridiculed it. It was with this stage that Dr. Halsted was concerned and it appears that he did much to establish and improve upon it during his years in New York. Everyone well remembers that Lister's publications on the extraordinary value of carbolic acid dressings and a spray of carbolic acid during operations which appeared about 1869, and his further work in support of his ideas, were received very coldly by British surgeons. Practically none of them except his own friends and assistants attended his operative clinics, but German and French and other foreign surgeons came there and studied reverently. Lister's visit to German clinics shortly afterward was in the nature of a triumphal progress.

Dr. Halsted writes: "The technique of Stephen Smith and Sabine was, I believe, quite true to Lister's formulæ. I had probably read all of Lister's brief publications on the subject and cannot recall having seen anything radically new in technique. During my first visit to Europe (1878-1880), Billroth was using a thymol spray but von Bruns had discarded it. I learned that the kind of dressing used was of little consequence. It was a pity that Lister never learned this and devoted his later years of activity chiefly to the impregnation of dressings with various antiseptics. Weir was one of the early ones to adopt Listerism in the United States—Americans had in general no comprehension of the

principles or possible future of antiseptics. Many New Yorkers gave it a trial—Van Buren, Keyes, Lewis Stimson, Markoe, Bull and others. Ashurst ridiculed it and Gross after lecturing on it for a few weeks announced to the students that he had done so at the request of the Trustees but that he thought it worthless. It is safe to state, I think, that America learned antiseptic surgery from Germany and England from America."

Dr. Halsted with Richard Hall did much to establish in New York these principles not only with regard to the use of antiseptics, but perhaps more especially with regard to the actual nature of tissues and their response to injury. It was then that he invented gutta percha protective tissue dressing which is so generally used and which presented a smooth, impervious sterile surface to granulation tissue rather than the rough surface of gauze which had to be torn away when the dressings or drainage appliances were changed. It was then, too, that he realized the beneficial effect of leaving a clot of blood in an open space that he wished to have filled up with scar tissue. Schede had brought before the German Surgical Association in 1886 the revolutionary idea that healing might take place very well under a moist blood clot, and this Dr. Halsted regarded as " the greatest contribution to the technique of surgery since the introduction of antiseptic methods by Lister." His own paper records the

good results of this method in the early cases in the Johns Hopkins Hospital.

He treated herpes zoster and various inflammatory conditions by stroking the skin with the Paquelin cautery (a white hot platinum bar) so lightly as to produce merely a blush. This method was devised by his friend McBride, but he extended its use. He studied with an enthusiasm that lasted through most of his life the geometrical considerations that bear on the measurements of the leg when the pelvis is tilted and when there is disease or fracture of the hip, and for years this was one of his favorite topics of discussion with the students. Then too he made as demonstrator of anatomy a most elaborate study of the anatomy of the fasciæ of the groin. Much of this had to do with his later interest in the radical cure of hernia. He was a good anatomist, as Dr. George Munroe attested, but he could not draw *at all,* while Munroe could. The drawings which Munroe made from these dissections illustrated a paper read by Halsted before a meeting of the New York Surgical Society of which he had been made a member, but the paper was not published.

This may give a slight idea of the kind of activity that occupied him in these years. But a new interest came with the news of the discovery by Koller, announced at the Heidelberg Ophthalmic Congress in September 1884, that with cocaine one could anæsthetize the conjunctiva and cornea. At this time

he had associated with him Dr. Richard J. Hall [17] and Dr. Frank Hartley, who were his assistants at the outpatient department of the Roosevelt Hospital, and at once they began experimenting with this substance. This study seems to have proved fascinating and they experimented on themselves

[17] A long letter from R. J. Hall some years later may be quoted in part.

"SANTA BARBARA, Sept. 2, 1895.

"MY DEAR HALSTED:

"It is now quite a long time since I received a long letter from you and a very kind one. I am not sure that I ever answered it for at that time I was only pulling myself together after a long period of misery, the causes of which I do not need to describe. During the last three years I have been slowly working my way into a fairly good surgical practice and as you will see from a prospectus which I sent you the other day, will have now about thirty beds under my control which I hope to keep filled next winter mostly with operative cases. Dr. Otto whose name is associated with mine is a thoroughly trained German physician. . . . . Of course neither my field for work nor my scientific opportunities can ever compare with yours which seems to me the most enviable of any in the United States but probably that is as it should be, for when we worked together in old times I may have thought that in information and perhaps in judgment and diagnostic skill I could pretty nearly equal you, I always recognized in you an originality which I do not find in any other American surgeon. . . . . My greatest grief is my isolation. Even in San Francisco and Los Angeles which I visit, there is little to be learned and except in conversation with Dr. Otto, nothing in Santa Barbara. I have kept up regularly all my journals and study them. But still I am like an artist banished from Paris. I long for the times when we used to discuss cases in the Roosevelt Dispensary. I learned a great deal from you in those days. . . . . (After a long discussion of his operations and technical methods he goes on to say) 'We have rather a nice place a little way out of town near our private hospital, have two nice little girls and I think I may say, are very happy.'". . . .

He died in California a few years later.

and on the students in their quiz. They found out a number of surprising new things, and it seems to be one of Dr. Halsted's most brilliant discoveries to have learned in the course of these experiments that if cocaine be injected into the trunk of a sensory nerve the area to which the branches of that nerve spread out becomes quite insensitive, and that this lasts a longer time if the circulation through the part is impeded by a bandage or tourniquet. He found, too, that infiltration of the nerves and tissues with water, salt solution and other fluids could produce anæsthesia. This nerve blocking or conduction anæsthesia has come into general use, perhaps especially by dentists who, although they may use novocaine now, can perform the most dreaded operations such as boring into a sensitive tooth or extracting a tightly fixed molar, without the least pain if only they inject a little of the drug into the tissue of the nerve. This has become familiar to everyone, and shortly before his death the dentists of the country met at a dinner in honor of Dr. Halsted and presented him with a gold medal in recognition of his originality in devising this surgical method and of his great service to dentistry.

In their many experiments to test out all the details of the action of cocaine he and his assistants and the various friends and students who lent themselves to the study often observed that if the dose were rather larger they might be dizzy and nauseated for a time, but they apprehended no evil re-

sults, for these feelings soon passed off. Indeed they found that there was a certain exhilaration about its use, and if the drug were snuffed up the nostrils by those who had a cold they breathed more easily. It became rather the fashion to snuff it at the theatre, where it seemed to add color to the play. They little suspected the devastating effects that are inevitable, for as we now know it is the most terrible and demoralizing of habit-forming drugs. Great interest was excited in New York by the discovery of this drug, and the *New York Medical Journal* especially contained in 1885 many articles on its remarkable effects.

One by J. K. Bauday, written after it began to dawn on them that it was not a harmless drug, is especially graphic in its description of the evil effects (*New York Medical Journal,* 1885, xlii, 339).

> As soon as a medicinal dose of cocaine has reached the general circulation, a feeling of wellbeing is experienced; all sense of physical or mental fatigue which may have been present disappears as if by magic; the mind becomes excessively clear; ideas constantly flow and the faculty of speech seems especially exalted. So long as these effects are continued, sleep is impossible: no fatigue is experienced from continued muscular movements, no matter how prolonged. . . . .
>
> Insomnia is the rule—an insomnia which is not followed commonly speaking, by the exhaustion ordinarily thus produced. It is astonishing how night after night during which sleep is almost entirely unknown, are succeeded by days during which the subject is not apparently greatly depressed, not unrefreshed, during which he is able—not however without effort

and procrastination that are characteristic, increasing—to resume his daily labors and even perform brainwork of considerable complexity.

The most alarming poisonous effects of the drug are: debasing and enslavement of the will, a general demoralization which is as diabolical as it is indescribable, and which tends rapidly toward depravity and to the development of everything that is degrading and ignoble in human nature. Habits of the most detestable character, a settled indifference to every interest of life, destruction of the most noble affections and affiliations, the utter death of friendship and of all the nobler qualities, complete disregard of all social and domestic duties, of even pressing family necessities and the common interests of daily life, the radical extinction of every previous religious spark that had enlivened the soul, the development of the most intense selfishness—these are the certain results of indulgence in this the most powerful and devilish drug which it has ever been the misfortune of man to abuse.

It is not surprising that a number of these young men fell victims, all unconscious as they were of the menace, and it is a dreary thing to relate that several of them never recovered, but died shortly in a miserable condition.

Dr. Halsted did not escape. Those who knew of it kept it for many years a secret, and perhaps some of them may still feel that it would be better forgotten, but it is with no thought of uncovering a disgrace or belittling him that we speak of it freely. For, first of all, those early victims were quite innocent of any knowledge of its habit-forming character, and secondly, he, almost alone of the many who fell under its influence, conquered it through super-

human strength and determination and came back to a splendid life of achievement. Lastly, it marks an extraordinary division of his career into two contrasting epochs. While in New York he was a powerful, restless and tireless worker spending himself physically and mentally in endless operations, controlling services in several hospitals, teaching day and night and at the same time serving an increasing private practice. After this interval he came back to a far more thoughtful leisurely life, with time for reflection and contemplation of his surgical problems, a life in the end far more fruitful than could ever have been the strenuous rush of his existence in New York if he had kept on at that pace. After all, in his case it was probably no misfortune but rather the reverse.

But the experience itself was rather terrible. It is difficult to learn anything very definite about it, but it must have been in 1885 when he was persuaded by Dr. Munroe and Dr. Vander Poel to go to a hospital in Providence for a year. He took a trip to the Windward Islands in February and March of 1886 and then worked very erratically in New York on the preparation of lectures to be given in competition with Bull and Hall for the chair of surgery in the College of Physicians and Surgeons, but these lectures were never given. There is a statement that he went to the Hospital in May, 1886, but whether this was really the first time is uncertain. In December, 1886, he was invited to

Baltimore by Dr. Welch who was established there and they lived together for a time, but even then he had to go back to Providence. There he sent for the manager and asked him to make sure that he should have no money so that he could not buy any drug.

V

EARLY YEARS IN BALTIMORE

Experimental Studies in Dr. Welch's Laboratory

In December of 1886 he came for the first time to Baltimore to be with Dr. Welch, and it must have been then that he met Dr. John S. Billings, then Librarian of the Surgeon General's Office, at a small and intimate dinner arranged by Dr. Welch at the Mount Vernon Hotel. Dr. Billings was of course, as everyone knows, deeply interested in the project of adding to the then flourishing Johns Hopkins University an appropriately matched school of medicine, which had been contemplated from the beginning. He had guided all the planning of the Hospital which was being built, and in his book on the buildings one may read of what seemed then new ideals and new ideas in the construction of hospitals. They had a great influence upon the construction of hospitals elsewhere, so much so indeed, that Dr. Hurd in his address at the ceremony of the opening of the new hospital in 1889, said that it had already served great ends and that, even if there were never a patient received within its walls, it had justified its existence in the effect it had had on the future of hospital building.

Dr. Billings was also much concerned in the choice of the physicians for the new hospital. Dr. Welch

had been called in 1884 and had accepted the appointment as Professor of Pathology. The chair of Surgery was first offered to Macewen, but he made impossible conditions, and later Dr. Welch won Billings over to the choice of both Osler and Halsted. Dr. Kelly was entirely Dr. Osler's choice, as neither Dr. Billings nor Dr. Welch knew him. In the selection of the rest of the medical faculty, President Gilman took a greater part. But this was the famous group of four, further immortalized in the Sargent painting.

Dr. Halsted remained in Baltimore during the winter of 1886-1887 and lived with Dr. Welch in the house at 506 Cathedral St., where they were looked after by an old lady, Mrs. Simmons, and her daughter, Miss Simmons. He began work in Dr. Welch's laboratory, supported and encouraged by him. Indeed the friendly attitude of Dr. Welch—his abounding faith in the great future of his protégé and his wisdom in all his relations with him, filled Dr. Halsted with a gratitude and devotion which he could never adequately express throughout his life.

He must have begun his work in the laboratory almost at once, for in his paper about intestinal suture published in 1887, his experiments are dated December 12, 13 and 14, 1886, and so on through January, February and March. In a footnote he says that they were completed April 1, 1887, and given in substance in a lecture delivered at the Harvard Medical School April 5, 1887.

These experiments were done in the southeast room on the second floor of the old pathological laboratory—the room afterward occupied by Dr. Bloodgood. Dr. Welch's room was just across the hall, and Dr. Councilman was probably in the small room at the northwest corner of the same floor. Such details will interest few, but they do interest some of us very much and show how intimate was the arrangement in those early days. Others in the laboratory about this time were Nuttall, Abbott, Herter, Bolton, Brewer, Booker, Sternberg, and a little later Walter Reed. Dr. Mall was Fellow in Pathology and had already studied under Ludwig and His in Leipzig. He and Dr. Halsted became close friends and worked together at these experiments on the end to end suture of the intestine.[18] They began by restudying the anatomy of the intestinal wall. The essential discovery was that the strength of the wall to hold the thread of a suture lay in the submucous coat, and that the stitch, to be properly taken, must engage this coat.

Dr. Halsted often talked with pleasure of those days in the laboratory and of his association with Dr. Mall and Dr. Councilman. There was always an air of banter between them. Dr. Halsted loudly

[18] In all these experiments they were greatly assisted by the willing service of John Schutz, the janitor in the pathological laboratory, who took a great interest in their work. This man was there for years and all the early autopsy records were dictated to him and appear in his legible handwriting. The poor fellow died about 1896 of tuberculosis of lungs and larynx.

claimed that it was he who taught Dr. Mall to think, and even, through the mishaps that might occur in such experiments, to move with reasonable alacrity.

At a meeting of the New York Dermatological Society on March 22, 1887, he discussed with extreme clearness the paper of Dr. Brewer on the treatment of gonococcal infections by irrigation with weak sublimate solutions, which he had devised during his years at the Roosevelt Hospital. In this he showed a comprehension of the subject in sharp contrast with that of the other speakers and supported in all details the statements of his former assistant, Dr. Brewer, who had continued the work at the Roosevelt Hospital.*

It was shortly after this that he left Baltimore again to go of his own accord to the hospital in Providence, where his final and complete recovery was assured. He must have returned in the autumn or winter of 1887, for we find him in February and March of 1888, and again in October, November and December of that year engaged every day in experimental operative studies of the thyroid in dogs.

* G. E. Brewer. Modern treatment of urethritis. Jour. Cutaneous and Genito-Urinary Diseases, 1887, v, May.

Dr. Brewer at this time was resident physician in charge of the Insane Department of Bay View Hospital, Baltimore, where he effected important reforms in organization and in the care of the patients, this department being at that period under the professional supervision of the Johns Hopkins University. Later, Dr. Brewer entered upon his distinguished career as surgeon to Roosevelt Hospital and Professor of Surgery at the College of Physicians and Surgeons in New York.

The observations on these experiments are recorded almost daily through January to June, 1889, and some of them to January, 1890. The hospital opened in May, 1889, so that we are probably correct in thinking that his absence was in the summer of 1887, and that his experimental work was continuous after his return in the autumn or winter of that year. The paper on the experiments, carried on from February, 1888, to some time in 1890, was not published until 1896, although Dr. Welch had presented some of his results at a meeting of the Association of American Physicians in Washington on September 20, 1888.

Baltimore in those days, forty years ago, was a very different place. It was relatively small and had all the gracious charm of an old southern town. Most of the better houses were on Charles, Cathedral and St. Paul Streets, with the cross streets and Mount Vernon Place, and there were no shops in that district. There were shady trees well watered through the loose brick or cobblestone pavements, but now all dead of thirst. It was quiet and peaceful and the houses had an air of hospitality which was more than fulfilled when one came to know the family. Most of them had green gardens behind or along the side, but such was the simplicity of the customs that to sit on the front doorstep in the soft summer evenings talking with friends who passed on their leisurely way was pleasant. It was a community then, and if one walked down Charles Street in the morning

one met and greeted a whole procession of friendly acquaintances. Dinners were famous for their good cheer and certain hosts in particular were known as connoisseurs of terrapin and Madeira. The Monday Germans had all the social distinction that the city could offer and were justly famous for their courtly traditions in a city famous for its beautiful women. It is true that the business district was old and shabby, with narrow streets and alleys, and that everywhere there were cobblestones and loose brick sidewalks. It is true that there was no sewerage system, but gutters along the streets with stepping stones to cross at the street corners, and that on Saturday nights the gutters might be in flood with soapy bathwater. It is true too that Jones' Falls was all uncovered and bred mosquitoes and that we had ever so much typhoid fever and malaria. But still it was a delightful, friendly place to live and one was happy.

Then there came the great fire of 1904 and the whole business district was burned, and after that everything changed suddenly. All the streets, widened down town where it was possible, are closely paved with concrete or asphalt; all the trees are dead or dying; everyone who could, has gone to live in the country or in the newly built suburbs. A horde of nondescript people and foreigners and swarms of negroes have arrived and increased until whole districts have changed their population completely. Shops occupy almost all the hospitable old houses

and one of the largest is an undertaker's establishment. And you never see anyone you know except by arrangement, and Charles Street is packed with jostling people whom nobody knows.

But in those days Dr. Welch and Dr. Halsted were young men—too young to be members of the Medical Reunion, so that they formed a junior medical reunion with Drs. Robert Johnson, Moale, Harrison, the two Van Bibbers, the younger Frank Donaldson, Michael, Councilman, John N. Mackenzie, Barton Brune, Booker, James Brown, Lockwood, Ashby, and many others, that met monthly for much enjoyed evenings.

The old Maryland Club was on Franklin and Cathedral Streets in an ancient mansion, rather ramshackle with rats in the wainscoting, but extremely pleasant and quite unique as a club famous for its good cheer and its comfort. Both Dr. Welch and Dr. Halsted were members there and rather objected to the transfer of the club to its new building on Eager Street.

They had a good many friends, and were particularly kindly received by the James family, and by Judge Dobbin's, Judge Brown's and Dr. Donaldson's families, with whom they sometimes spent week ends at Lawyers Hill near the Relay, and by many others. These friendships lasted through Dr. Halsted's life, or so long as the friends survived. With President Gilman and his family he also enjoyed friendly relations.

He saw a few patients although he never had an office, and even then he was rather looked up to by people in general as a surgeon, somewhat to the irritation of some of the established surgeons of the city.

He drove about and over to the laboratory behind the hospital in a cab, and seems to have attracted some attention by his rather unfamiliar appearance, because in this quiet town he always wore a tall silk hat and was dressed with the most impeccable taste. A letter which Dr. Councilman has been kind enough to write gives a very graphic picture of the work of that group and especially of that of Dr. Halsted.

I first knew Dr. Halsted in 1886. I had returned from Europe in 1883 and for a time worked in the physiological laboratory of the University which had just been erected on Eutaw Street. Dr. Welch had been appointed Professor of Pathology in 1884 and on his return from Europe in 1885 we began work in the partly completed pathological laboratory of the Johns Hopkins Hospital which was then being constructed. Halsted, who was regarded as the most brilliant of the younger surgeons of New York, came to the laboratory the following year. It was a period no less interesting in surgery than in other branches of medicine. Save in the work of a very few men there was no utilization of the knowledge which later revolutionized the art of surgery, there had not been a full acceptance of the demonstration of the germ theory of disease, nor of the contributions which Lister had made to operative methods designed to guard wounds from infection, and there was great ignorance of the part which tuberculosis plays in the diseases of those parts which are in the domain of surgery. Although a great deal of work had been done on the question of the relation between suppuration and bacteria, and

the best methods of operation and wound treatment to prevent suppuration, the whole matter was in a confused state and no one with the knowledge then at hand could carry out a major operation with reasonable certainty as to the result.

Halsted proceeded to work on the basic questions of operative procedures and the treatment of wounds. He read all the old papers of Lister which were published in the Lancet and carried out all the methods which he gave, experimentally on animals, but with a more thorough study of the results than would have been possible when Lister did his work, for in 1886 the science of bacteriology had been developed and reliable methods of work established. The methods of Lister were complicated and involved the use of materials which were difficult to procure. Halsted showed that cultures made of wounds treated after the most meticulous use of the Lister methods showed the presence of bacteria on the surfaces. This led him to a careful microscopic study of wounds and the realization that care in operating, the exact approximation of surfaces and the avoidance of dead spaces was as important for results as the supposed avoidance of bacteria. He made a careful study of the organization of blood clot which he showed played an important rôle in wound healing, and of the causes of stitch abscesses. He devised the subcutaneous suture to avoid passing the suture through skin which could not be disinfected. Everything connected with surgical procedures he studied experimentally with the single question always in mind. The character of sutures and their disinfection was studied and the inadequacy of many of the methods demonstrated. Koch's paper on the uses of corrosive sublimate as a disinfectant had just appeared and seemed to settle the question of wound and suture disinfection until the fallacies of the use of corrosive in disinfection were shown. The study of hand disinfection was no less thorough and this led to the realization that the hands could not be sterilized, and finally to the use of rubber

gloves in operating. The use of the rubber glove in operating is, I think, one of Halsted's great contributions to surgery.

The entry of Mall, who was the first Fellow in Pathology, into the laboratory marked a period of brilliant activity. Mall's first work here was on the structure of the intestinal canal, and in the course of this he demonstrated the peculiar character of the submucosa. The two men were very congenial and they worked together in the large south room of the laboratory, each receiving from and giving to the other. Halsted made full use of the work of Mall in the development of his method of intestinal suture. He was fond of demonstrating that when a loop of small intestine was clamped in the handle of scissors and pulled through, both muscularis and mucosa were stripped and a stitch caught in the submucosa still held. I remember very well the experimental work in intestinal anastomosis and the huge distended circles which were produced by sewing together the ends of a severed loop of small intestine. From the same period came his very important work on the thyroid. He was also developing his operation for cancer of the breast and he frequently accompanied me to Bay View where I was pathologist, in order to have the use of a cadaver.

It is difficult to think of surgery more carefully conducted than was this experimental surgery by Halsted. The dog was treated as a human patient, there was the same care in anæsthesia, the same technique in operation and in the closure of wounds. There was no basis of comparison between Halsted and the other surgeons of the city of Baltimore. There was a fine tradition of the old operative surgery which was associated with the name of Nathan R. Smith, and there were several very excellent operative surgeons, the best of whom was a visiting surgeon to Bay View and had there acquired a good knowledge of pathological anatomy. But the surgery of Halsted was different, it was scientific in that he tested by the experiment all theoretical conceptions of the art. Probably

not since the time of John Hunter had the experiment been so fully used in the development of surgery. During all this time before the opening of the Johns Hopkins Hospital he saw no human patients and confined himself to experimental work. He had the advantage, of course, from his hospital work in New York and from his studies in Europe of a pretty thorough knowledge of surgical disease and he read extensively. He was also very fortunately situated, there was a keen devotion to work in the laboratory under the remarkable leadership of Welch, a number of men of more than ordinary ability actively engaged in research and there was a fine spirit of cooperation. Welch himself at the same time was engaged in the study of the wound infecting bacteria, Abbott was studying disinfection, and all this work had some influence on that of Halsted. All of his work on cocaine had been done in New York and laid aside. I think during this period I may have been the first person whose inferior dental nerve was injected to produce anæsthesia of the area of its distribution. I remember having had a raging pain in an inferior molar and the complete relief which resulted from the injection followed by a painless extraction.

It was perhaps natural that when Halsted first came to Baltimore he should have had but little sympathy for the people. He was greatly amused over the peculiarities of the Southern pronunciation and the negroes gave him great delight. Afterwards he became greatly loved by both the medical profession and the laity. He was a man of great dignity of manner and always immaculate in dress. We lived in those days at the laboratory in great simplicity and were accustomed to eat our luncheon in the back room of a not very high class beer saloon. On one occasion while there Halsted had related an amusing anecdote, and the very dirty old proprietor who was standing near, passed his unclean hand over Halsted's bald head with the remark "Du hast deine Haare nicht umsonst verloren." It gave us all who had at times suffered under Halsted's keen wit, a great joy to witness

his flushed face and confusion. At another time, I found him at his rooms in a state of indignation for his landlady had just sent him a bill for the cost of having his cannel coal which he had been at great trouble to procure in large lumps, broken into fine pieces.

During the years 1888 and 1889 Dr. Halsted was enthralled with his studies of the thyroid gland in dogs. He found that if he removed part of this organ showing the normal structure with rounded alveoli lined with low cubical cells and filled with colloid secretion, the remainder when examined a month or two later had acquired a different structure in which the alveoli were larger with complicated folds in the walls, a lining of high cylindrical cells and little or no colloid secretion. This he regarded as a compensatory hypertrophy or overgrowth which should make up by its intensified function, expressed by this change in form, for the loss of the secretion of the part that had been removed. This explanation he thought was confirmed by finding that the thyroid of puppies, born of mothers which had been largely deprived of their thyroids, were enormously enlarged. He was most enthusiastic about this and for years regarded it as one of his most important contributions. Nevertheless he was aware that it was not perfectly clear cut and invariable—sometimes mere manipulation or the ligation of a small part of the gland seemed to produce this change, sometimes not. Occasionally he could produce it by injecting bacteria into the body cavity and sometimes he found it already well developed

in the thyroids of apparently normal dogs, never subjected to any experiment.

The fact, later observed, that this is extremely like the change found in Graves disease or exophthalmic goitre added greatly to its interest and had much to do with the idea that in this disease, so common in human beings, there is overactivity of the thyroid gland.

Many people confirmed these observations of Dr. Halsted, in later years, by experiments on all sorts of animals, and Dr. Marine has been especially vigorous in upholding them. But later Dr. Halsted himself noticed in one or two experiments of the same sort that there was no hypertrophy of the remaining fragment and set one of his assistants, J. A. Hunnicutt, to work on it. This time the same experiments were carried out in a great many animals and no hypertrophy was found in the remaining portion. In 1913 Dr. Halsted read a report on all this before the Association of American Physicians and tried in vain to find some explanation of the discrepancies—and finally left the cause of this peculiar hypertrophy unexplained. Could it be the effect of a different diet, or of disinfection of the skin with iodine, or of a different surgical treatment of the operative wound?

Most workers still feel that the reduction of the quantity of thyroid tissue naturally forces the remnant to compensate by overgrowth, and when the reduction is extreme this is very evident, so that they

feel that the greatest difficulty is in explaining the negative results of these later experiments. Marine is especially confident of it after long experience, but thinks that iodine may prevent the structural change and itself act as a substitute. Leo Loeb finds that thyroid extract and thyroxin will prevent the compensatory hypertrophy but that iodine rather tends to stimulate the remnant of gland to increased growth and especially to increased complexity of structure. All in all, the nature of this whole process is still somewhat obscure. Surgeons have recently shown that large doses of iodine restore the hypertrophied thyroid tissue in exophthalmic goitre to something approaching the normal appearance for a short time, and this supports Marine's results.

The story is told in so much detail mainly to make it clear that with the glands of internal secretion we are so completely in the dark about the normal mechanism of their activity, that it is excessively difficult and hazardous to explain the changes that follow disease or experimental derangement of the gland.

It is an example, though, of Dr. Halsted's unswerving desire for the truth, that when he suspected a flaw, he went to extreme pains to search out the opposite of what he had concluded in his earlier work and published a paper which should obliterate the discovery of which he had been so proud. But the end is not yet and much must still be done to learn the whole truth in this matter.

VI

OPENING OF THE HOSPITAL. MISS HAMPTON. MARRIAGE

The Johns Hopkins Hospital was at last nearing completion and efforts were being made, especially with the guidance of Dr. Billings, to gather together the best possible staff from out of all the world. As long ago as December, 1875, a committee was appointed to purchase land near the hospital for the Medical School, and in 1876 the square upon which most of the buildings of the Medical School now stand was acquired. On March 1, 1880, a committee of three of the Hospital trustees and three of the University trustees was appointed to consider the prospects and plans of the medical school. The minute read:

> Whereas, It is important to develop plans of the University in respect to medical education and the full requirements of the University cannot be foreseen until the opening of the hospital, the following be designated as professors in the medical school, Ira Remsen Professor of Chemistry, H. Newell Martin Professor of Physiology, J. S. Billings Professor of Hygiene. *Resolved,* That these with the Professor of Pathology (to be hereafter designated) consider plans for the development of a school of medicine.

Dr. Welch was appointed Professor of Pathology in 1884, and Dr. Councilman Associate in Pathology

in October, 1885. In October, 1889, Dr. W. S. Halsted was appointed Associate Professor of Surgery, Dr. H. A. Kelly Associate Professor of Gynæcology and Obstetrics, and Dr. Hurd as Professor of Mental Diseases. Dr. Osler had come earlier in 1889 as Professor of Medicine. Dr. Halsted was the only surgeon and was made head of the Outpatient Department or Dispensary and Acting Surgeon to the Hospital. Shortly after this he was made Surgeon in Chief and on April 4, 1892, Professor of Surgery.

In the spring of 1889, before the formal opening of the Hospital on May 15, Miss Caroline Hampton, who had graduated at the New York Hospital as a trained nurse in 1888, was appointed head nurse for the surgical division. Inasmuch as the story of her life is for the rest of time bound up with that of Dr. Halsted, it must be begun much further back.

Among the letters preserved in such numbers in the Halsted household and left to the University are several written in a woman's hand on small sheets of paper, yellow with age, but still showing a silver or scarlet border and sometimes a monogram in silver or red. They are all addressed " dear Papa," and every one ends abruptly and is incomplete. But among them there is one beginning " Dear Sally " and signed " your affectionate brother Wade," that gives the clue, for he could only be Wade Hampton and she Sally Baxter who had married his brother Frank. And she was the future Mrs. Halsted's mother. The letters are in them-

selves so delightful that one cannot resist the temptation to print them, at least as a footnote.*

Sally Baxter, when still a very young woman in New York, was greatly admired by Thackeray, who, on his visit to America in 1852, thought her the most lovely and witty woman in America. While he was in New York he was constantly at the Baxter house,

* LANGSYNE

Sunday April 15, 1855

Imagine my situation and position, if you can, dearest Papa. Does not this big blue sheet suggest a gentleman's library and these tracks a quill pen, which I have seized as the freest and fastest implement of description. But write as I may I can never say all I would to furnish you with an idea of the beauty of this place. We started yesterday morning by the Charleston cars and reached Columbia in about two hours whence we were transported to the plantation by a big carriage drawn by four mules, driven by a negro as swarthy and sturdy as the animals themselves. First you must know that this Plantation is considered rather a model place even in South Carolina where there are so many fine ones. It is not very large, 3000 acres and about two hundred slaves, but has been in the Chives family since the first settling of the country and at present they hold but about fifteen slaves not born on the land and in the family. I have not ceased to wish ever since I have been here that you could see it, so different an aspect of Southern country is it to any you have seen. There is no trace of the barren arid soil and scanty vegetation which you deplored so last year. The land looks rich and carefully cultivated and on every side is a stretch of lovely landscape, just undulating enough to relieve all feeling of monotony. I can't describe to you the impression it made upon me when we turned from the public road into the gate which took us on to the Plantation.

On every side of us lay the cottonfields just planted with regular lines and extending as far as the eye could see. There is a vast difference, I find, in viewing the country lying before you simply as landscape or when your thought is of its purpose.

We rode in this way for a long way and then came to the quarters which form a little whitewashed village with troops of dusky children playing about, ready to set up the shout as soon as they saw us,

Lt. Col. Frank Hampton in 1856

Mrs. Frank Hampton (Sally Baxter) in 1856

"the brown house" on Second Avenue at Eighteenth Street, as one may read in his letters published by Miss Lucy Baxter in the Century Magazine (Thackeray's Letters to an American Family. Century Magazine, 1903-1904, Vol. lxvii, new series, Vol. lxv; also published in book form by the Century Company, October, 1904). One of those letters, at

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"Missis, Missis, oh be joyful, Missis come." Nobody could pity the condition of these slaves—well tended, well cared for, they idolize their mistress, who, in her turn, devotes her whole time and energy to their improvement and comfort. But as they thronged round her, each one clamoring for a greeting, their animal faces and idiot gestures and grimaces brought more forcibly than ever to my mind the conviction of their difference and inferiority in race. No, let the abolitionists and philanthropists say what they wish, they can make them only a superior animal.

The more I see of the South and Southerners the more am I convinced of the utter impossibility that a northerner can ever properly judge the institutions of this part of the country. We *cannot* I believe in the least appreciate the spirit which actuates and animates them. The feeling of the master to his slaves is a feeling as unfamiliar and foreign to our natures, as much an unknown quantity as if it were another sense. What is to become of it? Anybody who stops to investigate can't but see how utterly unpracticable to the southern mind is any idea of compromise, and how northern fanaticism on this subject is ever to be moderated Heaven alone knows. I wish you, dear Papa, could see a review of Mrs. Stowe's book "Uncle Tom" written by Mrs. McCord, because there are a good many facts therein stated about which I remember hearing you inquire. It seems funny that I should be bandied about so fiercely by the two parties, for you must understand that the Chives and McCord family is as much the stronghold of the slavery party as the Adams faction is of the Abolitionists. Mrs. McCord is hotly engaged in the strife and almost all her feeling and intellect seem to be expended on that one topic, and she and her husband warmly espouse the cause in every paper and periodical to which they can get admission.

This kind of life on a plantation and among the slaves themselves is the kind of thing one needs to find out properly what southern life

least, speaks of the wedding which took place on December 12, 1855, during Thackeray's second visit to America. It seems that Miss Baxter must have visited a Southern plantation, that of Mrs. McCord, in the spring of 1855, and it was probably in that autumn that the courtship occurred, for in her letter

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is. I find that so far my last year's experience was nothing. Actually to my mind the responsibility of slave holding and the care and anxieties of a mistress particularly, seem almost an impossible burden. Thank heaven that we have one load less to bear.

This is a tremendously prosy letter dear Papa. . . . .

Saturday evening.
Dec. 29, 1855

The letter which came tonight dearest Papa makes me feel as though I hadn't written to you at home at all. And I believe in truth my letters have been nothing, or mere skeletons, to show what material there was to make letters of, for which I hadn't time. And when I had time hadn't the capacity to fill out. But until now, when illness has brought a pause, necessarily it has been a continued hurry. My letters have been written at odd ends of time never consecutively and almost invariably in a hurry. I do wish daily and hourly that you could be here, or not being could have some *rapport* with me by which you could know of my thousand different feelings. It is all such a new life, so different from anything we in the least know of at the north that until you see it you cannot form an idea of it. The ease and liberality with which everything is conducted makes it seem so natural that one forgets what is in reality great magnificence. I wrote to Mama about our "*mount*" the other day—just for an ordinary party eleven horses and besides that Mrs. Singleton had in use a carriage and horses, the girls had gone to town with another and Mr. Wade followed us in his buggy with a pair. We sit down every day fourteen to twenty at dinner—people come and go, stay or not as they please and it all passes off as a matter of course. But besides all this, which impresses one of course, there is the family, which seems to me the most remarkable of any I ever saw—four unmarried sisters—each utterly different from the other and yet it is impossible to say which is the most attractive. Such highbred elegance and with sufficient more than ordinary cleverness, such

of December she is established at Millwood, the Hampton house. Her letters give a vivid impression of the life there and later at their place, Woodlands, which was quite near. When the Civil War broke out both of the Hampton brothers were at once en-

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perfect femininity and womanliness. And then the men—you know—no you don't know half for I didn't until I saw him here, what my Frankincense is, and Wade is in his way as as admirable. I think I haven't said a word about him as yet—which is basely ungrateful for he has been the soul of kindness to me and is withal so charming, so lovable that I can't say too much in his praise. He has, in common with them all, singularly unpretending manners and this joined to perfect ease and familiarity with the world, gives him at first the appearance of indifference. But his constant thoughtfulness of others and forgetfulness of self, his thorough goodness of heart and purity of mind warms you in a moment. You would not believe were I to tell you—yes, you might dear Papa, but other men couldn't—how tender and gentle those two great men have been in my sickroom. Half a dozen times in the day brother Wade will come to my room to inquire about me and always with some suggestion for my comfort that shows he really thinks about it. Now that I am out and about, tho' still suffering from the pain, he watches me, sees when I am tired and notices the least indication of pain. As for Frank, one would think to see him that, instead of a sportsman, he had been all his life a sicknurse. He never left my side all Wednesday night and Thursday morning when I was so dreadfully sick and since I have grown better, only just when it was necessary for him to go to his meals and then but for a moment and comes back to pour out my coffee and toast my bread and see that I eat something and have all that I need. It is something quite novel and touching to see a *young* man, unused to these little cares, fulfil them all so tenderly and gracefully and thoughtfully. Not for a moment does he seem to forget me or my comfort and yet it is all done so naturally that I almost fail to detect its perfection. Certainly I am a very fortunate woman—for what other woman ever went from such a father to such a husband.

And now dearest Papa what are you going to do with Lucy? She seems from Mamma's letter and your own just rec'd to be too sick to be trusted away from home, yet I'm persuaded that a journey and a change are all that will do her the least good. Can't you . . . .

gaged. The military record of Wade Hampton, the elder brother, is generally familiar and his public life afterward as senator and his death in 1902 at the age of eighty-four, are well known. Frank Hampton, the husband of Sally Baxter, was born in 1829 and was killed at Fleetwood Hill in the battle of Brandy Station on June 9, 1863. He had married Sally Baxter in 1855, when she was twenty-two, for she was born in 1833, and their married life was broken after only seven years by her death in 1862. Of their children, Frank, Lucy and Caroline, Frank, the eldest, died three years ago (1926), Lucy, who is Mrs. Haskell, surviving. Caroline was Mrs. Halsted.

Caroline, left as a very little girl without her father or mother, was cared for and brought up by the three sisters of her father—the Misses Caroline, Anne and Katie Hampton, who are mentioned in one of her mother's letters and who were afterward known as the "Aunties." Miss Caroline was "Aunt Dodie" and it was she who cared for the little Caroline. There was another uncle besides Wade Hampton, Christopher, known as Uncle Kit. He died before Mrs. Halsted was married but he was an interesting man and had a great formative influence in her younger days.

The old house at Millwood must have been a very luxurious and rather splendid place—it was directly in the line of Sherman's march and was destroyed by his soldiers so that only a few pillars remain.

Remains of Millwood

Probably Mrs. Halsted had no recollection of it, for afterward a small house was built on the grounds and it was there that she spent her childhood.

Miss Sally Carter, who has been kind enough to tell me much of this, knew her at school in Virginia. This school, Edgehill, near Monticello, was kept by Miss Randolph, a great-granddaughter of Thomas Jefferson. Miss Carter went there as a teacher and came thus to know the two Hampton girls, Lucy older than herself, and Caroline two years younger. They all enjoyed riding and were much together and became great friends—a friendship which has always been kept warm.

Miss Caroline Hampton left school in 1879 or 1880 and went back to Columbia, or rather to the house at the site of Millwood a few miles outside of Columbia. They had a hunting lodge and a large tract of land near Cashiers, North Carolina, rather high in the mountains, and much of her time was spent there. She was a very graceful rider and spent a great deal of her time in the saddle, doubtless accompanied by her dogs of which she was always so fond. Indeed her expertness with horses and all the things that have to do with life in the south country was one of the most remarkable things about her through her whole life. But she tired of being there with her aunts, doing nothing but ride, and her high spirits rebelled. They were poor because the war had left them bereft of nearly everything, and in 1885 or 1886, without much consultation with anyone, she left the south and went to New York to become a trained nurse.

At first she went to the Mt. Sinai Hospital, but shortly she transferred herself to the New York Hospital, where she graduated in 1888. In the spring of 1889 she came to Baltimore and was appointed head nurse in the surgical division of the new Johns Hopkins Hospital, where she began work with the opening of the Hospital in May. At that time it was planned that there should be rather distinct divisions, each with its head nurse, but in September of the same year there was appointed a Principal of the Nurses' Training School. This was Miss Isabel Hampton, a northern woman, not related to Miss Caroline Hampton, and in no way resembling her.

Miss Caroline Hampton was of a different mould from most young women. Used as she had been all her life to the extreme respect shown her family, which held an almost feudal position in the Carolina country and used herself to the same attitude from all the people throughout that country where she was known as Miss Ca'line wherever she rode or in whatever company she found herself, she was still, after the rigors of the discipline of New York hospitals, the spirited girl whose life had been surrounded by all the courtesy and best chivalry of the South. Some thought her a great beauty in those days—all agree that she was an aristocrat in the best sense, delightful to those whom she made her friends, perhaps a little intolerant and curt with others. Here in the hospital her expertness and flair for all practical rather mechanical things stood her in good

stead and she seems to have been a very good nurse. But it was inevitable that a highstrung person of this type, accustomed always to so much consideration, should clash sometimes with another woman set in a position of authority. It seems to have been on this account that Dr. Halsted arranged that she should be head nurse in the surgical operating room, where she was relatively independent and where she could give play to her tastes for practical application of mechanical devices. He mentions this once in an article published in 1913, in a way calculated perhaps to give no hint as to his true attitude toward her.

"In the winter of 1889 and 1890—I cannot recall the month—the nurse in charge of my operating room complained that the solutions of mercuric chlorid produced a dermatitis of her arms and hands. As she was an unusually efficient woman, I gave the matter my consideration, and one day in New York requested the Goodyear Rubber Company to make as an experiment two pair of thin rubber gloves with gauntlets."

This was the beginning of the use of rubber gloves in surgical operations—now universal.

Dr. Halsted lived in the hospital in the two rooms on the third floor at the southeast corner, which have since then been occupied by the matron. He, with his characteristic painfully minute sense of what was exactly right about furniture or clothing or surroundings in general, had had those rooms

painted over and over until the color of the walls suited him precisely. Miss Carter tells of a day when he invited her to tea in his rooms with Mrs. Haskell—formerly Miss Lucy Hampton—and her sister, the head nurse in the operating room. There was an open fire and the room had a rather Victorian look with much stuffed furniture and a large photograph of the Sistine Madonna. They had very black Turkish coffee, and Miss Hampton walked about and stood by the mantel. Miss Carter realized that there was something between them then and on the way home with Mrs. Haskell they spoke of it. Mrs. Haskell did not see how a Hampton *could* marry a doctor or anyone but a planter. This was an intensely South Carolinian attitude, but Miss Carter assured her that he was going to be a great man. Very soon they knew more certainly about it. There was no long engagement—only a few weeks—and Miss Hampton resigned and left the hospital before the engagement was announced. A whole series of dinners occupied them before the wedding. Dr. Osler gave one, Dr. Welch another, and then Dr. Donaldson and the James family.

They were married on June 4, 1890, from her aunt's home on the grounds of old Millwood, a short distance outside of Columbia, and Dr. Welch was best man. They drove into the town and the ceremony was performed in the church in Columbia. After that they went to the family hunting lodge at Cashiers in the mountains for their wedding trip.

Miss Caroline Hampton in 1889

Miss Carter, who saw much of them throughout their married life, always felt that this was the beginning of a devotion to her that lasted unchanged through both their lives. He had known nothing before of the southern type and was greatly impressed by what he saw of them and gathered from the conversation about him. She was romance itself to him, and he never ceased to feel surprise that she should care for a person so unworthy of her as himself, which, as Dr. Welch remarked, is perhaps the proper attitude for a husband.

After that they returned in the autumn to Baltimore and lived for a time in a house on Preston Street near Calvert, but sometime later took the large house at 1201 Eutaw Place, where they lived until the end. Every summer they visited the Hampton place at Cashiers, and after a time he bought it from the Aunts. They gave it the name of High Hampton, partly because the ancient home of the Halsted family in England had been High Halsted. Later they built a more comfortable house there, and this became the real center of Mrs. Halsted's life rather than the house in Baltimore, for it was here that all her talents could display themselves, and every year she spent much more time in the mountains than did Dr. Halsted, leaving Baltimore earlier in the summer and returning later in the autumn.

VII

SURGICAL TECHNIQUE. HERNIA. CANCER OF THE BREAST

From this point on Dr. Halsted's story is that of a continuous enthusiastic effort to carry out in the hospital a plan which had formulated itself in his mind in the earlier years and which consisted in three things—to perfect the technical methods of surgery; to study experimentally and otherwise the several great topics which from the beginning had engaged his interest and, above all, to establish a school of surgery by training his assistants so thoroughly and through so long a time that they might leave him and transmit his teachings undiminished in other schools. It may seem that this is reasoning backward from the end result, but when one follows him through the years one cannot escape the conviction that all this was thought out early in his career. Leriche, in 1914, was particularly impressed by the plan of long service of the resident assistants, contrasting it with the rapid changes in the staff in the Parisian surgical clinics, but, of course, it was part of the general plan adopted in the Johns Hopkins Hospital from the first, though emphasized by Dr. Halsted.

With the beginning of his surgical service in the new hospital Dr. Halsted's major interests came to

the fore as one may easily gather from the papers presented at the meetings of the Johns Hopkins Hospital Medical Society. The treatment of cancer of the breast, the radical cure of hernia, the healing of wounds especially under a moist blood clot, were the main themes appearing over and over in 1890 to 1895. Of course these subjects were discussed in many other papers in later years, but in those years hernia came up eight times, cancer of the breast three times, and the healing of wounds six times in the addresses and exhibitions of cases that he made before various surgical societies. Other things, such as the surgical treatment of tuberculosis, especially that affecting bones and joints, in which the value of air and sunlight were emphasized, already interested him. This beneficial effect he recognized long before the open air treatment became so generally familiar, and demonstrated year after year, showing that the end results in hospital patients kept continuously out of doors on the "bridge" were far better than any that could be attained by operation. He also discussed a few miscellaneous topics showing a continued interest in fractures and dislocations. There were certain fields of surgery, now almost the domain of specialists, that did not engage his active personal interest, such as the surgery of the thorax, of the brain and cord, of the kidneys and bladder. All of these as well as the surgery of the nose and ear, have been developed in a wonderful way in later years by members of his staff, in

every instance definitely at his suggestion and with the most generous assistance.

With regard to his study of the conditions under which wounds heal, the letter of Dr. Councilman gives a picture of his attitude in those early days. If it seems that much is reiterated concerning this it is only because it was a thing which interested him continuously and was interwoven in all his other interests. Every experiment, every observation in human cases seemed to point to the same principles. If he introduced considerable quantities of bacteria into the peritoneum of a dog without any mechanical injury of the tissues, the dog might well survive without any peritonitis, but if he crushed any tissue within the cavity or injured its blood supply, or if he introduced foreign bodies which might cause injury and form a foothold for bacteria, the same bacteria would cause a fatal peritonitis. It was quite the same with a healing wound. If the tissues were injured or ligated so that some minute portions were deprived of their proper supply of blood, bacteria could flourish there and the wound broke open and flowed with pus. But if the life of the tissue were carefully protected by ensuring its blood supply and by guarding against crushing or tying off a considerable part with a ligature—a thing that is so tempting to a surgeon because it so quickly stops the bleeding of more than one minute vessel—then the wound remained clean and the few bacteria always there were overcome and killed. Later he

found, following Schede, that it might be possible to avoid the dreaded result of leaving a cavity within the wound, by allowing it to fill up with a blood clot which in itself has a modest power of disinfecting and becomes finally a sort of scaffolding into which new bloodvessels and fibres grow until they replace most of it with a scar. It was from such studies that he learned how to treat the tissues, as he made the wound that was later to heal. He treated them tenderly and watchfully, gently separating them and painfully transfixing with a needle and tying with extremely fine black silk every minute bleeding vessel—so that in the course of his dissection everything was left clean and dry and above all not bruised or strangled. Equally careful was his attention to the bringing together of the tissues when the wound was to be closed—fascia exactly united to fascia, muscle to muscle, layer to layer, and finally the skin with carefully placed sutures, often of silver wire, and then a superficial silk suture—near the surface and bringing together only the very edges, so that after a time it could be rubbed off. All this extreme care he probably exaggerated a little in order that the assistants might at least approach the ideal when it came to their time to operate.

Professor R. Leriche, then of Lyon,* now of Strasbourg, wrote after his visit to Dr. Halsted, admiring greatly the precision of his technique and its foundation in the respect for the tissues and the per-

* R. Leriche. Lyon Médical, 1914, cxxii, 402, 1014.

fection of hæmostasis. He says, "One might think that he who conceived this must be a complex being, but one would be mistaken. Halsted is the most unpretentious man—the most exquisitely unaffected that one could find. He accomplishes the rite which he has established as something commonplace—and never speaks of it. It is almost as though he thought everyone had always done just that, so normal it seems to him."

Professor Leriche's appreciation of Dr. Halsted's work furnishes one of the clearest statements to be found anywhere, and it is particularly interesting that it comes from a Frenchman and not from one of the Germans with whose thought Dr. Halsted had been so long familiar. The visit was followed by an almost continuous interchange of letters between the two men and a lasting friendship.

As to the work on inguinal hernia the story is long and characteristic. Dr. Halsted showed at a meeting of the Johns Hopkins Medical Society in November, 1889, several patients whom he had cured by an operation devised apparently on the basis of all those dissections of the fasciæ of the inguinal region which he had made in New York and for which Dr. Munroe had made the drawings. Almost at the same time there appeared a paper in an Italian journal by Bassini describing a very similar procedure. Obviously Dr. Halsted had no more knowledge of Bassini's studies than the latter had of Dr. Halsted's, and the question of priority is not worth discussing.

At any rate the number of patients requiring relief from hernia increased steadily, and in 1892, 1893, 1894 and 1895 Dr. Halsted published other papers on the results of his operation and upon the various modifications in the procedure which he had devised. In 1899 Dr. Bloodgood reviewed these results in several hundred cases, and in 1903 Dr. Halsted published one more paper with illustrations describing the operation in its best form as it is performed today in almost every case. Finally Dr. Adrian S. Taylor * reviewed, in 1920, the results of about 2500 operations in a paper in which the value of each new detail in the operation is estimated. Through these years there had been much discussion as to the propriety of transplanting the cord, of excising the veins, of the use of the fascia of the rectus muscle, of the especial value of the cremaster muscle in completing the closure of the weak place in the lower abdominal wall and of the importance of high ligation of the neck of the sac. Taylor writes:

> Thus there may remain, as Dr. Halsted believes, little of the original operations of Bassini and himself that is essential except the free and clear exposure of the entire canal which makes possible the high ligation of the sac. The transplantation of the cord and the futile attempt to reestablish the obliquity of the canal may be omitted. Even the suture of the internal oblique muscle to Poupart's ligament may prove to be an unnecessary detail provided the cremaster muscle is well developed and properly utilized.

* Adrian S. Taylor. Archives of Surgery, 1920, i, 382.

Dr. Halsted, in a note written just before his death, felt that the excision of the veins should be abandoned, and realized apparently with pleasure that Taylor's report showed clearly that the best results were obtained by those who followed implicitly the details specified by him in his paper of 1903.

The whole story is characteristic because it reveals the tireless concentration of attention upon every minute detail of a technique which in its end results gave the answer to the problem which he had set himself. The operation is a "physiological experiment," the outcome of which may be learnt only years later. The problem is to find what tissues can be relied upon to furnish, because of their texture, their topography and the strains ordinarily put upon them, the best artificial closure of the defect and incidentally how one can avoid injury to the circulation and nutrition of the organs which are only by juxtaposition involved in the scene of operation. Thus gradually worked out it resulted in a relatively simple operation which could be performed by a house surgeon and would relieve permanently a disabling condition which was the more distressing in that the risk of strangulation hung always over the wearer of a truss. It was a great contribution and worthy of such a surgeon.

Dr. Halsted's interest in cancer of the breast was of just the same type as that in inguinal hernia, that is, he studied the situation, which at that time was very hopeless, not only in the publications of all

the surgeons of the world and especially the Germans, but more particularly in its actual pathological aspects, as shown in dissections and microscopical study of the cases themselves. Up to that time Volkmann appeared to have proposed the most satisfactory operation—one regarded as a classic by the German surgeons. He found that the cancer extended downward to the sheath of the pectoral muscle and therefore he dissected off this sheath, but even in his hands the local recurrence of the tumor after a time took place in about sixty per cent of the cases. There were hardly any cases known to have remained really cured and there was dispute as to whether one might say that there was a permanent and complete cure if the tumor had not come back after one year or after three. Now we know that even more years must elapse before the patient is relieved from the fear of a return. It was a gloomy outlook but Dr. Halsted devised an operation which he first described in 1888 and which in the course of years he modified from time to time on the basis of further consideration of the results in the increasingly numerous cases which were brought to him. The essential character of this operation lay in the removal in one block, of the whole area that might be involved, never allowing the incision to approach the actual tumor. The attempt was made to go so far wide of the new growth that no tissue should be cut through which was already affected by the tumor in its most remote prolonga-

tions. This soon involved the removal of both the pectoral muscles and all the lymphnodes and adjacent loose tissue, not only in the axilla but in that side of the neck, and the grafting of skin over the enormous open space left uncovered. That it is not perfect and certain of a permanent result, Dr. Halsted well understood, but the success of this formidable looking operation in producing complete cures has been remarkable. In his first discussion of the results in 1894 he begins by saying, " in fifty cases operated upon by what we call the complete method we have been able to trace only three local recurrences."

In all of these operations, as need hardly be said, the extreme attention to hæmostasis and cleanliness, and the gentle handling of the tissues in which sharp dissection is important, were never neglected. Dr. Halsted especially emphasizes the importance of the careful avoidance of any incision into or through the tumor, just as if it were a tissue loaded with bacteria which could be transferred to the surroundings or into the circulation, and start the process anew. He was greatly impressed with the work of Handley who studied so carefully the spread of these tumors by way of the lymphatics, and had of course long been familiar with the earlier work of Lothar Heidenhain. He himself was extremely skilful in the recognition, by the naked eye appearance alone, of the types of tumor which may be encountered at operation, and felt that the ability so to

recognize the tissues is an absolutely necessary part of the surgeon's equipment. He deprecated in no measured terms the practice of cutting into a tumor, so that the pathologist might make the diagnosis some days before the operation. Dr. Bloodgood has carried out Dr. Halsted's teaching with extreme care, and in many papers emphasizes the importance of early diagnosis and complete operation. His statistical analysis of the hundreds of cases shows a high percentage of permanent cures when the disease is recognized at an early stage.*

Such then, was some of the work during the nineties, and it seems that the perfection of two such procedures as the treatment of hernia and that of cancer of the breast with such brilliant success is a very great contribution to human happiness. Before that neither of these conditions could be cured—this bold statement is practically exact, for the cures were in the nature of accidents or miracles while now they are almost matters of routine. This is perhaps too optimistic in cancers of the breast, for the most astounding spread throughout the whole body is sometimes found at autopsy after years of apparent complete wellbeing, but even so the permanent cures are many and the span of comfortable life is greatly lengthened, even in those that ultimately succumb.

* Am. Journ. Med. Sciences, February, 1908, and many later publications.

VIII

THE SURGICAL STAFF. OPERATING ROOM TECHNIQUE. OPENING OF THE MEDICAL SCHOOL

In the preceding chapter examples have been given of Halsted's success in two of the three great aims of his professional life, the promotion of a proper mode of technical procedure in surgical operations and the study of the several great problems in disease that roused his interest. The third aim, the training of surgeons and the establishment of a school of surgery, was probably nearest his heart and it was by no means neglected in these early years. This necessarily depended upon his good judgment in the selection of the men who were to be his assistants and this seems to be attested by the success of many of the members of his staff whose names have become familiar in more recent times as distinguished surgeons. Dr. Finney tells of his vivid recollection of his first meeting with Dr. Halsted on the day of the formal opening of the hospital. His name was known to Dr. Halsted because the staff of the Massachusetts General Hospital had sent a letter recommending him, but when he arrived it was Dr. Welch who took him under his wing and along the crowded corridors until they espied Dr. Halsted.

After he was introduced and Dr. Welch had departed, Dr. Halsted said, " Nice day, isn't it? " And when Dr. Finney assented, " Quite a crowd here today." Well there was, so Dr. Finney agreed. " Have you seen the hospital? " " Yes, Dr. Mall showed me around." " Oh, that must have been interesting." And then Dr. Halsted took out his watch and said, " I have an engagement in the laboratory—will you start work in July? " and left Dr. Finney there, appointed to something, he knew not what.

Various men were appointed in those early days to the post of resident surgeon in the hospital, and to them was entrusted the immediate responsibility of the care of the patients in the wards. Brockway was the first and after him came Baltzell and Bloodgood. There were other men who never became resident surgeon who have nevertheless made names for themselves in surgery. Cushing arrived in 1897 and became resident in 1898.

After Miss Hampton left, Miss Sharpe was head nurse in the operating room, and Miss Gross took her place in 1898. For a time Mitchell, who was afterward resident surgeon, occupied this post, which he coveted, although he had not yet begun his medical studies. So sure was he of his intention to become a surgeon that nothing was too arduous if it brought him into contact with Dr. Halsted.

The operating room was a small room at one side of the amphitheatre where the clinics were given to the students. It had a small room attached for etheri-

zations and a large case for instruments. There was a wooden table which Dr. Halsted evidently invented, for he has described it in detail. The equipment was of the simplest and there was none of the marble and shining nickel that seems a *sine qua non* of the modern operating room. The technique of the antiseptic approach to asepsis was rigorous and even painful to the staff if not to the patient. Instruments were boiled and kept on the table in pretty strong carbolic acid. The preparation of hands and arms involved scrubbing with green soap after thorough toilet of the nails. Then hands and arms up to the elbows were plunged into saturated permanganate solution and came out deep purplish brown; this was decolorized in strong rather hot oxalic acid and then you soaked for minutes in glass vats of corrosive sublimate so planned that by bending the elbows one leaned on hands and forearms immersed in this solution. By that time painful red pimples had appeared all up and down the arms but, nevertheless, sterile rubber gloves with gauntlets filled with this same solution were drawn on, spilling the rest of the fluid back into the glass dish. Then one was ready to assist in the operation and the slightest suspicion of contact with any unsterilized object made it necessary to return to the sublimate for a time. This must have been very effective but it seems that milder substances are used now. Indeed, in the early days the faith in corrosive sublimate was rather excessive, for it led to a practice, soon abandoned,

of prolonged irrigation of open wounds which involved the risk of mercury poisoning. With this as with the planning of the operation itself Dr. Halsted was always alert to study carefully the merits and defects of each procedure. There was nothing of the fanatic about him and he was as ready to abandon a favorite method as to adopt a new one if he were convinced of the desirability of the change. Indeed he was always experimenting with methods and with materials, as his papers show plainly in describing the needles and glass spools, clamps and scalpel handles and all sorts of contrivances which he was constantly inventing and improving. The Halsted mosquito clamp for grasping minute vessels until the ligature is applied is known and used everywhere and it would require only the perusal of any instrument maker's catalogue to learn how many ideas he contributed to this mechanical side. Sometimes, especially in his later years, the mechanism became quite complicated, but he knew that simplicity is very important in assuring the usefulness of an instrument or the lasting value of an operation.

Patients came to the hospital in ever increasing numbers and, quite naturally, there came a higher proportion of those affected with the diseases in which Dr. Halsted showed a special interest. There were only four times as many surgical patients in 1899 as in 1890, but ten times as many hernias and nine times as many cancers of the breast.

In these years up to 1899 it is difficult to find any record of anything very startling that happened to him. There are minute notes of his experiences in driving with two horses from Baltimore to High Hampton and of all the country hotels he endured on the way. There are many appearances at the Johns Hopkins Medical Society where he presented cases or discussed miscellaneous surgical topics or even gave more notable papers such as have already been mentioned. He was assiduous in his attendance at the meetings of the American Surgical Association and went to one in New York in 1895 and another in New Orleans in 1898, where he took an active part. He was also a frequent speaker at the meetings of the Medico-Chirurgical Faculty in Baltimore, and in May of 1899 attended a meeting of the Suffolk District Medical Society in Boston, where he spoke on the surgery of the bile ducts.

In 1899 he went to Europe and visited the clinics of Kocher in Berne and of Roux in Lausanne. This was in July, and his notes on his observations in the operating rooms are very minute and extremely critical. The descriptions of every detail of each operation are so vivid that one can see the whole thing and follow his train of thought as he watched. He was distressed over the way the anæsthetic was given: "The patients are perhaps usually anæsthetized by an orderly who is a feebleminded fellow and knows nothing about the administration of ether. The patients are *always* partly asphyxiated." He

seems a little shocked, too, by some of the actual surgical technique—the placing of intestinal sutures without recognition of the structure of the intestine: " the intestines were handled roughly in the suturing, and the ' Serosanaht ' certainly perforated the lumen at almost every stitch." " Kocher has made the observation which we have so often made that the deep wound heals in infected cases but the parts under the skin suppurate; for this reason the skin is not closed in those cases until granulations have formed, *i. e.*, a ' secondary suture,' an unpleasant procedure. But unpleasantness plays no part here or in Germany."

Evidently there was another American surgeon visting the clinic at the time and Dr. Halsted explained to him the catgut-silk paradox as follows:

Paradox because (1) a surgeon uses catgut because " he cannot get good results with silk—has stitch abscesses continually from ligatures as well as sutures."

(2) A good surgeon (Kocher for example) says, " I have had no more trouble since I gave up catgut and commenced using silk exclusively." The surgeon hears this and says, " Well, now I understand why so few of my wounds heal well. I should have used silk instead of catgut." " I said, ' Don't try silk, you will have more trouble than with catgut! ' " Explanations followed.

A bad technique will get best results with catgut.

A good technique best results without catgut, that is, with silk. Good and bad results are relative terms.

Almost anyone can get pretty good results with catgut, but no one gets perfect results with catgut. To prevent even an occasional failure the good technician resorts to silk. In the hands of a bad technician silk is disastrous.

When he went to Lausanne he was far more critical and less interested, but described the operations in just as much detail. He was impressed by a craze for brilliant operating among European surgeons and felt that "we should take a stand in America for conscientious surgery with some interest in the result to the patient." He observed closely all the technical methods used in Kocher's clinic and especially all the modifications of instruments which had been introduced there, and took care to buy at once such instruments as he thought valuable for his own use on his return.

This seems to have been the beginning of a friendship between Professor Kocher and Dr. Halsted which lasted until Kocher's death. It was also the beginning of Halsted's admiration for Kocher as a surgeon for, in later years, he rated him very high among the surgeons of the world and was perhaps influenced in this by his appreciation of Kocher's habit of studying profoundly each of his several surgical problems from their anatomical and pathological aspects before beginning to apply his surgical methods to their cure. This was so much Dr. Halsted's own way of approach that there could not fail to spring up a real intellectual sympathy between the two men, and this was always recognized by both.

In 1893 the Johns Hopkins Medical School was opened with a small class, but it was not until 1895 that this group of students presented itself to Dr. Halsted for the course in surgery. It brought a new element into his life in Baltimore to have students eagerly awaiting a systematic course and he planned teaching clinics and operative clinics for them. His was never a systematic course, but his clinics were meant to present some subject, usually one of those in which he was especially interested, in a way that would have stirred the spirit of an investigator but was somewhat difficult for us. He discussed at great length the measurements of the legs when variously inclined to the pelvis and sometimes the diagnosis of cancer of the breast. One or two of us acquired merit by reading Koenig's Surgery in German where other surgical topics were treated. Two of the men in the class carried out by themselves various operative procedures in another hospital where opportunity was given them, and one or two probably helped the Professor in some of his experiments, but although a course in experimental surgery was announced in the catalouge each year, it was not arranged for the whole class until some time later.

But in the operative clinics the students were greatly impressed, not by his skill nor by anything dexterous or showy, but perhaps by his intense interest, which seemed to be concentrated on the pathological condition and its significance and the real meaning of what he was trying to do in its bearing

on the future state of the patient. His operating had nothing of the standardized character so often seen when the surgeon arrives at a final decision as to what he is to do, or even accepts the diagnosis of an assistant and proceeds rapidly to do the routine operation for that disease.

Those who watched felt that he was still carefully studying each detail of what was being gradually revealed to him, they realized his great skill in naked eye diagnosis in the case of tumor tissue, and the operation became a combination of pathological demonstration and surgical treatment.

Dr. Halsted's teaching was, even for the students, through example, and they felt that in watching him they were face to face with his problems, but guided by his experience. It was first hand knowledge that they gained and not ideas already wearied with repetition. It has already been said that at one time he was a first class quizmaster, but now he had become for the students an eager inquirer who allowed them to see what had roused his interest, what difficulties he encountered, and his best efforts to overcome them. After all these years it seems that for them it was a very wonderful opportunity.

IX

LIFE IN BALTIMORE AND IN THE MOUNTAINS

For him such work was varied, although not entirely interrupted, by a long vacation each year, part of which he always spent at High Hampton, although he made many trips to Europe. Nothing else changed the tenor of his life for the next thirty-two years, and while we may follow it in the order of the years, and trace the growth of the younger men who formed his staff or the beginnings and course of friendships with various surgeons abroad and others at home, the tenacity of his interest in certain problems of surgery was such that his work may be more satisfactorily reviewed when he had given his last touches to each subject.

Even in those days few were on familiar terms with Dr. Halsted. He had become a member of the Maryland Club on February 7, 1888, and there in the old club building on Franklin Street he saw much of Dr. Welch, Major Venable, Dr. Frank Donaldson, Jr., Dr. William F. Lockwood, and others. He probably spent more time there in those days than later, when in January, 1892, the Club moved to its new building on Eager Street at the corner of Charles, for then he was married and as in the years

that followed he was hardly to be seen there except when Mrs. Halsted had gone south to High Hampton. He never played cards nor any of the other games that pass time in a club, but he had always been interested in boxing and used to go with some others to boxing matches or prize-fights usually held in a theatre far down in the town.

In general his demeanor toward each person was the extreme of courtesy and politeness. Probably this was largely the result of a sort of shyness. It seemed rather labored and excessive and was correspondingly embarrassing. No one was ever at his ease with him except his close friends who felt nothing of such inhibition and found him the most delightful, natural and interesting companion. He was very shortsighted and his glasses somehow added a little to the difficulty of communication with him. He took them off to examine anything closely and critically and that gave him a quite different expression. In his letters, too, his extreme courtesy seemed to make what he wrote stilted and labored, but perhaps this formed an excellent background for the caustic things he could say or for the occasional *bon mot*. For instance, in a very polite letter to one of the younger assistants who had just left, he says, " Dr. Welch will be gratified to hear the nice things you say of him. I do not believe that your confidence is misplaced."

In Baltimore he was very happy in the friendship of Doctors Osler and Welch. " One day," writes

Miss Stokes (his secretary), " Dr. Halsted was talking on his favorite subject, Dr. Welch, and was speaking of his popularity. He contrasted the personalities of Dr. Osler and Dr. Welch and described Dr. Osler's progress down the corridor of the hospital with an arm over a shoulder here, a slap on the back there, and a queue of followers. ' Could not imagine Welch with his arm over his assistant's shoulder.' " Nor could we imagine Dr. Halsted with his arm over any assistant's shoulder or slapping him familiarly on the back.

It was interesting to watch these great men on their entrance into a room full of people. Dr. Osler gracious to the least of them, Dr. Welch full of *bonhomie,* conversing easily with everybody, Dr. Halsted approaching cautiously, extremely attentive and alert for signs of friendliness from anyone and then listening most politely, but perhaps behind this courtesy summing up the vanities and frailties of the speaker.

In Baltimore he was always extraordinarily careful of his attire. Every detail was guarded—every suit of clothes, and he had dozens of them, was made by the best tailor in London. His shoes he had made in Paris, for some strange reason—and there he insisted on selecting the particular place in a skin from which he would have the leather cut. When six pairs of shoes arrived in Baltimore he examined them closely and sometimes recognized a failure on the part of the shoemaker to adhere strictly to his orders

as far as the choice of leather was concerned. Such a pair of shoes was cast aside and never worn. Shirts he had made at Charvet's in great numbers from carefully chosen material, and these were for years sent to Paris to be laundered. He asked some Baltimorean who seemed especially well groomed, one day, whether he knew of a good laundry and admitted, when one was recommended, that he had found it necessary to send his linen to Paris to be laundered.

But with all this care there was nothing conspicuous about him. No one could be less pretentious or simpler. If he wore the most correctly cut coat with carefully irregular hand sewn seams and a glistening silk hat when no one else wore one, it was not done with any air but only because it was his habit.

The same extraordinary attention to detail seemed to enter into the choice and arrangement of everything in their house and when they gave a dinner it was he who must supervise everything, even to the selection of flowers, of every article of the menu and of all the china and linen. He particularly objected to any sign of wrinkles in the tablecloth and had it ironed on the table. Coffee was to him something to be approached with only the utmost refinement of the connoisseur's art. He insisted upon caring for every detail in its preparation himself, picking out with minute scrutiny each rather pale coffee bean, grinding the exact number to a prescribed degree of comminution and then, with an appropriate technique

producing an extremely black coffee, after which the guests remarked that sleep fled them for several nights. His exertions over such dinner parties were so exhausting—whether to him or to her—that finally in his later years Mrs. Halsted protested against having any more of them. They had never entertained friends much at the town house partly for some such reason, but principally because she suffered so severely from migraine that seemed to be precipitated by such an occasion. Still more seldom did they go to the houses of their friends and I, for one, had never seen her until the year of his death.

The house at 1201 Eutaw Place was very large—much too large for two people who lived so much alone. Mrs. Halsted occupied the third floor and Dr. Halsted the second. In the front of the house he had his study with most of his library which was quite extensive and included many complete sets of surgical journals and a great deal on the history of medicine. But the rooms on the ground floor were also very full of books. Always, perhaps, especially in the earlier years of his life in Baltimore, he was interested in old furniture and his house was full of beautiful things that he had collected with great care. The rugs which covered the floors were for the greater part extremely fine examples of the best that Persia could produce, and these, like many of the pieces of furniture, have since graced loan collections in our museums. In searching for these things he had some acquaintance with the celebrated Dr. Crim,

whose name is known to collectors, and at whose famous auction he purchased several choice pieces of furniture. For several years Dr. Halsted kept a painstaking expert German carpenter in his house to repair pieces of antique furniture which he had purchased.

Dr. Boggs, whose medical advice both he and Mrs. Halsted sought in their later years, writes of him:

> He and Mrs. Halsted liked a cold house and the furnace heated only the southern half of the house, the northern side which contained their apartments was entirely unheated except for their open wood fires. He once talked to me at length on the subject of open fires, those in his house being the envy and despair of his friends. He said, "My father was a great student of the open fire and decided ultimately that lignum vitae was the only perfect firewood, burning slowly with small flame and almost without smoke. At that time he could buy the rejected pieces of this wood from a manufactory of tenpin balls and it was the most perfect fire I have ever seen. As I cannot command it, I use the next best, white oak or hickory ten to eighteen inches in diameter and dried for two to three years under cover." He had such logs sent to Baltimore from the North Carolina mountains.

They dined together downstairs and sometimes lunched there although he was rarely at home for lunch, but they breakfasted alone, he with a tray before his beloved open fire in his study.

Mrs. Halsted was a person slow to form friendships, although very faithful to those who finally won her regard. But through all her later life she was greatly attached to Mrs. Crowe who was with her a

great deal, since the Crowes occupied an adjacent house on Linden Avenue. This friendship was a great comfort to her and a delight to Mrs. Crowe who found her so interesting. About the same relation grew up between Dr. Halsted and Dr. Crowe and indeed he came to depend upon Crowe for many helpful services.

Mrs. Halsted, when she went to Boston in 1920 to be with her aunt, Miss Lucy Baxter, who was very ill, spent a great deal of time with Mrs. Cushing for whom she conceived a great affection and admiration which seems to have been warmly returned.

One summer, shortly after their marriage, Mrs. Halsted accompanied him on a trip to Europe which doubtless took them to London and Paris and Germany although there is no record of its details. But apparently she did not enjoy it very much, for she never went again although he went often alone. It seems, though, that he made no such trips for several years after that, although it is possible that he did go once or twice before 1899. At least he was absent from Baltimore every summer from about the end of May until October and never failed to spend part of this time at High Hampton.

One autumn day Mrs. Halsted was driving in Druid Hill Park when there was an accident of some sort in which, skilled horsewoman as she was, she was thrown from the high dog-cart in which they delighted to drive, and was severely injured. Dr. Halsted was away and Dr. Finney came at once

to the house and cared for her really terrible injuries. Pelvis and femur were fractured and the ribs on one side crushed in so that she suffered a great shock. Next day Dr. Finney went to the station to meet Dr. Halsted and to apprise him of the situation, anxious not to dismay him by too awkward a revelation of the news. When he had said that his rather surprising presence at the station was because Mrs. Halsted had suffered a serious accident Dr. Halsted's sang-froid did not forsake him—" Is she dead? " he asked, and Dr. Finney was glad that a day had gone by so that she had come out of the shock and he could really say that she was safe. Everything went well under Dr. Finney's faithful care, and Dr. Halsted's gratitude was endless and he never forgot his debt. She would have no trained nurse, but only an old negro woman who tremblingly did what the patient ordered. Another time Dr. Finney operated upon Mrs. Halsted for acute appendicitis, and next day when he came in to see her she said she was uncomfortable lying there in bed—that ever since the accident she quickly grew tired of lying in one position—so Dr. Finney, knowing that she would do exactly as she liked whatever his orders, promptly anticipated her by saying, " Well why don't you sit up in this armchair? " To her great satisfaction he lifted her into the chair and settled her comfortably just as Dr. Halsted came into the room. Naturally Dr. Halsted was astonished and said, " Finney you get your

patients up sooner than I do " and grinned acquiescence when Dr. Finney said " Yes, sir, some patients."

Mrs. Halsted realized that he was rather averse to the entertainments of the social world and she set herself to develop High Hampton as far as possible into a place that might attract him and give him pleasure. It was largely for this that she hurried there as soon as spring came, and planted and trained vines and shrubs and supervised the workmen on the farm and tried to have it beautiful when he arrived. In this perhaps she deceived herself a little, for he in his turn made a great effort to adapt his tastes and accomplishments to hers. He knew nothing about horses while she was past mistress in every art that had to do with them—in riding and driving she was most expert, but he applied himself and in the end he probably reached her standards. She loved the place of course—it had been there for her through all of her life. Still, it was not altogether a life of ease or indolence that she could live there and sometimes it seemed quite adventurous. But there were many compensations—there was perfect peace and quiet, there was a glorious country with wonderful views of the valley and the mountains, there were horses and dogs under perfect conditions, flowers, especially dahlias, grew to greater splendor there than anywhere else and occasionally they had their friends to visit them. The Aunties were generally there and in later years they stirred the devoted

niece rather to pity mixed with irritation than to comfort in companionship. The country people round about were always interesting to both Dr. and Mrs. Halsted and in the course of years they came to depend upon Dr. Halsted for every sort of help—not only did he take their sick to the hospital in Baltimore and care for them or operate on them free of charge, often paying even their railway fares, but he advised them and aided them in every difficulty so that he was a sort of last resort for them in all their troubles. They were generally grateful, but there were many difficulties in dealing with them, usually the result of their shiftlessness or their superstitions and fears, but sometimes because they invaded High Hampton to hunt or even to fell trees. Mrs. Halsted's letters give perhaps an exceptionally uncomfortable impression of the whole thing. There must have been more restful peaceful times there. The following is not dated but must have been written in 1895 or 1896:

Cashiers, Oct. 7. 9.30 A. M.
in bed

Dear Wm.

I wonder if you will read a long letter that I want to write you or if it will only be wasted ammunition. I wanted to write you a full account of my adventures yesterday but a headache stopped me. I laid up last night but tho' in bed am only there for peace as I am feeling all right having just finished breakfast. My letter from Walhalla will have told you of my movements there. I started at 3.30 in a drizzle. In about ten minutes it began to pour and continued at intervals with more or less wind until I got to Hunters at six. There were two trees over the road and I almost upset driving round one of them. If it had not been for the gates, 4 you know, I need

not have gotten wet. As it was I got wet through. When I reached Hunters I undressed and, taking possession of the big room and the fire there, soon had the room decorated with female attire. It poured all night and the next A. M. I decided that I would wait until a hack came along that was going to the valley for Mrs. Johnston. About 9.30 having been up since 5.30 and feeling rather headachey I decided to try and move. It had stopped a little. I got a man on horse back with an axe at a pretty high figure to come along with me and we started at 11. Made Roland's at 12 and there met a man saying that tho' there was no timber down that could not be driven round I could not get along, the road was so rough. I wasn't to be bluffed and you know what I am on a turn back. It poured a deluge and my only worry, as on the whole trip was your buggy. I knew you would rather have me stuck on the road a week than have one thread injured. Still I could not make up my mind to have a headache in one of the tough places on the way. At the first branch of the river on inquiry about the road was again told that it was impossible for me to pass. That there was one place so washed that I would have to unhitch and pull my buggy over. My man was to have left me but decided that if I was going on that he would be in at the death so accompanied me to the dangerous spot. It was nothing compared to what I was coming to but we did not know that. He asked me what I proposed doing and I said that I could get around without trouble, which I did. He then left me, thinking, I suppose, that I was able to take care of myself. At Fowler's Branch I thought that I might perhaps have a swimming spree but did not. On getting near the house I found that the whole road had washed away about 4 feet deep straight down, leaving a bed of rock on my side. This Rena scaled with ease and got me to Fowler's. Thinking that timber would be down there if anywhere I engaged an escort to Crow's, being told again that I could not get along. My head was set however and on I went expecting to get Crow to go on with me. He however firmly declined and as my escort also refused to go further I had to put up with C. for the night. It was pouring and tho' my rubber had kept me pretty dry, one long trip through the woods round a fallen tree had soaked me. When I got into the house I found a fire that looked as if Aunties or Luly had been attending to it. I began to hustle and told them to make a fire in the kitchen so that I could undress and dry and not take up the one fire of the establishment. After a long delay I was told that the stove was going so I took my bundle and went in to it. I found a few smouldering sticks with the door open as the wood was cut too long to allow the stove door to shut.

Smoke pouring out of every crack and everything damp and generally nasty. I promptly returned to the other fire which I had somewhat improved and had all doors shut and stripped. When I got one remove from skin I sent Mrs. Crow to a corner, but about as I was no remove from nature she decided that the door across the room needed guarding so over she went. I had only the rough dry things that I had dried at Hunters but they were dry. I had not taken another dress but had a red wrapper which I put on and with a belt on looked or rather felt that I was fairly decent. I kept the fire going and I expect Crow had more wood burnt in the few hours that I was there than he had ever thought of cutting. There were two big hulking boys sitting around the house, but nothing could be got out of them. They would neither cut nor carry wood. I dried everything for a second time and watched supper preparations. The latter took away any appetite that I might have had. I made my supper and breakfast on corn bread which I had not witnessed making (it was cold and warmed up) honey and buttermilk. After supper while I was waiting for my room Crow and one of the boys sat down and played checkers. Finally I got to bed and found that I was not as happy as hoped for. There were no inhabitants but the room was smaller than Hunters smallest room (it had just room for the bed between two walls and about 2½ ft. on the door side). The window would not open and the vile pipe smoke came through and filled the room. The former occupant of the room Mr. English (I think you know him) had vacated on my account but had left all of his belongings. They added to the bouquet. Soon a strong breeze began to blow on my head from somewhere which tho' uncomfortable still was acceptable. I could not open the door as there were two dogs that slept at the door and I did not wish to have to arise in scant attire to rescue my pack. I got up as soon as I could see and finally got the road supervisor, Crow's eldest son, started with hands to cut out the timber and tho' two parties, one riding and the other walking, said that the road was impassable for a buggy I said that I would go. The bridge was washed up the other side of the Alexander place, but Crow said that by going through the old place I could get into the Silver Run road. I knew the way as we had often ridden it in my youth. English volunteered as an escort and after one half hour keeping me waiting while he dressed, came out quite dressed up. He had been most polite. When Rena came out to be hitched up I found that she had nearly pulled off one shoe and could not possibly travel. English said that he could fix it; Crow said that it would be impossible; that the shoe would have to come off. I knew that

Rena could never travel barefooted, so asked English to do what he could. He took the shoe off carried it to a shop near by, straightened it. There were no nails to be had so he hammered the old ones out, putting new points on them and put the shoe on as well as anyone. We started off rather in defiance of every one and I soon had a pretty badly demoralized young man as a companion. Rena was near home and feeling extra good and took everything with a rush. He several times said "Don't you think the brake would come in here." At first I was mad and then amused. After a while he found that I knew what I was about and left me alone. We had to put down two fences to get through the Alexander place and cut out one little tree so my passenger worked his way. After getting out of the place, we came to a narrow but very deep ford. Mr. E. got out to see if it were passable and when he returned saying that he thought it was all right I said "will you get in?" "Oh no!" he answered promptly "I will walk the log." Then his conscience seemed to trouble him and he said "But what will you do? Will you stay in the buggy or are you afraid?" I laughed and said "wherever the buggy goes I go." That was our last adventure except two trees down that could be driven round. I had as part acknowledgement to drive E. to the P. O. I felt that I ought to ask him to dinner, but he was such a tough and I was so tired that I just couldn't. I could never have done a thing but for Rena. She has covered herself with glory and every one thinks that I am crazier than ever. A letter from Luly saying that she cannot come up until after the 10th. That is pretty close now. Sweetman is not yet back. Apparently we have had the record breaking storm of the season. The mail today is the first since Saturday. So glad to hear that you were feeling well. But you would say so if you were not. I am very sorry to hear about Osler. Give him my love and tell him to come up here to recruit. I do not think that your waggon is injured, I covered everything with rubber and did as you said sit in a puddle. The little pillow took that on my side and Fritz on the other. I will go over it carefully again and see. That was the only burden on my mind.

Affy

C. H. H.

Another dated 1910 was evidently written to Dr. Halsted in Paris:

July 11th. 1910.

Dear Wm.

The two darkies are having double fits over my last scheme for ridding myself of rats and mice. After some trouble I managed to

have got for me two black snakes which are now happily reposing in the attic. They cannot possibly get into the house so I see no reason for their terror. The man announces that the wife has heart disease and if she were to see a snake she might die. She is not afraid of them, but he is. So I have promised to have them removed. They cannot be caught of course but we shall try to catch two others and palm them off. The lower one goes in the race, the bigger fools I suppose they find. I hope you have some of my letters by this time. Not that I have written many, but enough to let you know that I am alive. I am glad that you are enjoying your French lessons. To me your disposal of your summers does seem absurd. Instead of going away from stuffy, dirty cities where you have been living all winter you just go and immure yourself in another buggy place. If you must study French why can you not take it somewhere besides a large city. Still I suppose it is the amusement you want and change, not particularly French. For I do not see that what you have learned is of any use to you. We are still being rained upon and the ground is so saturated that the few hours of hot sunshine that we have some mornings does not dry it a bit. It is so hot that I have had almost to abandon gardening for I seemed to get so hot and red in the head that I could not but believe that it was doing me no good. I am sorry for my labours are very necessary. I am about the best hand on the place as far as I go. That is not far and now that I have two lame legs instead of one I am much hampered. The ram is on its annual strike and I am travelling pretty steadily to keep it going just for a little until the new washers come. I started to install the dam ram this A. M. but found a busted pipe as usual. We are getting the balance of the hay under cover this afternoon and though it will have to be thrown out again, it is a satisfaction to know that it is all together and safe. Not much this year. The next thing is to get the turnips planted but I fear it will only be to drop seed in mud. Luly writes that aunties may come up after all. Perhaps the end of this month.

I am afraid that Major is gone by this time as the last accounts of him in the paper were discouraging.

Aff.ly

C. H. H.

Dr. Halsted's own letters about High Hampton show his delight in the place which must have offered many pleasures. Most of them are letters of a rather

later date, but doubtless there was not much change from year to year. He was not much interested in the crops which flourished rather under Mrs. Halsted's care, but he did devote himself to the contemplation of the wonderful dahlias, the bulbs of which he ordered by name from foreign dealers in various European countries. It is to be supposed that Mrs. Halsted saw to it that they were planted and it appears that it was impossible to preserve them over the winter, because new ones were ordered each year—perhaps only new varieties, but in such quantity that it seems that the old ones must have perished. In one letter he says "Miss Thompson of Laurel paid us a very pleasant visit. The dahlias were quite up to the average but she came too early to see them at their best." (Miss Thompson is an expert specialist known to dahlia lovers.) In his next letter he says "I wish you could see the dahlias today. They are superb. I have filled the Nantucket basket with wooden labels and, armed with the catalogues am starting for the garden." And again "I have been spending the day with six of the hands transplanting the plants from one garden to another to fill the spaces left by those that failed to come up in the show garden. It has been delightful here. We have open fires every night and morning. Mrs. Halsted is wonderfully well. Her crops are unusually fine and she works in the sun from morning till night. Today she is planting about six acres of turnips for the cattle." "Our potato crop is so great that we

are embarrassed to know what to do with it. Today Mrs. Halsted is filling the silo. I wonder if you have ever seen a silo filled."

" The weather is still cool here. Mrs. Halsted and I are doing the cooking. Our servants have not arrived and it is impossible to find a soul in the Valley who can cook." " Yes our darkies have arrived at last. You can imagine what a relief it is to Mrs. Halsted and me. I became quite expert in setting the table, washing dishes, etc., and Mrs. Halsted is quite a good cook. I believe that I could now boil potatoes—am still a little unreliable on rice and corn bread."

Mrs. Halsted writes from High Hampton:

Every now and then I gently pat myself, so to speak, on the fact that Dr. Halsted has at last come to himself and fired Ella [an old Baltimore servant]. It is a thing I have hoped for many years but as long as she was of use to Dr. Halsted I would never say, send her off. She had long outlived her usefulness and for several years had been pretty trying.

And later:

I am so glad you are with me on the question of Ella. I had never expressed myself freely on the subject to Dr. Halsted but when he finally decided that she was to go I told him how I had held my hand for many years. Well the servants left this A. M. and I am happily entirely alone. My dinner has been served and I see no one until the milk comes at 6.30. My personal wants are few and I can always make myself comfortable.

In another letter also to Miss Stokes:

I am quite sure that you are making Dr. Halsted very comfortable. He writes to tell me how much trouble you have taken and that the house is in good order and nice and clean. You know I am no housekeeper. I have just gathered the rutabaga crop of four hundred and

fifty bushels. I did not want any of the men to stop to fill the sacks so took my cook, a girl of 18, and we filled as fast as the wagon could haul. She was not used to such work and though young is apparently worse off for the day's hard work than I am.

Dr. Halsted was also interested in an amateurish way in astronomy and had a large telescope which he took with him to the mountains where the air might sometimes be very clear. In one letter he says "Our rainy spell is over and it is now beautifully clear and cold. This morning I took a look at the heavens at 5 A. M. They were remarkably beautiful in the east—Jupiter, Venus, Capella, Arcturus, Castor and Pollux, Betelgeuse, Riegel, Sirius, etc., almost all in one field of vision."

There was good trout fishing in a pond on their grounds and the woods resounded with the notes of birds. Of course there were all sorts of farm animals and they always had good horses. Mrs. Halsted writes of some especially wild mare that seems to have come to grief in some way:

I always could have ridden her I think, but you did not think so. A person who does not ride never can understand how one who can ride does it as naturally as they breathe. You never understood either how crazy I always was to get out and away.

It seems, however, that he did understand very well her joy in galloping across country and made his utmost effort to fit himself to be a good companion for her on their rides. As to dogs, they seem to have had several kinds—but always a number of dogs in or about the house both in the mountains and in Baltimore. There are photographs of several beautiful

setters but most affection was lavished on dachshunds of which they usually had a pair. Nip and Tuck were famous ones but there were also Sisly and Fritz and probably many others. They usually occupied the seat one on each side of Mrs. Halsted when she drove and sometimes there were one or two other dogs crouched in the back of the buggy behind the seat. There is a picture showing this taken one summer when they seem to have spent some time in Southampton, Long Island, but which summer this was, there is no way of telling. In 1915 Dr. Halsted writes " We are very depressed today by the death of Nip. I have just made the autopsy. The cause of death was a valvular disease of the heart, a chronic affair which may have dated from his attack of distemper years ago. He has been ailing for weeks. Mrs. Halsted has nursed him night and day hardly leaving him for a moment. She is quite worn out. I think I wrote you that Sisly died a few weeks ago. So we are without a dog. I have the feeling that Mrs. Halsted will come to town earlier this autumn now that she has no dogs. She will miss their company sadly." There is much correspondence with Frau Payr, the wife of the distinguished Leipzig surgeon, about all the doings and misdeeds of another dachshund " Max " who was offered as a gift to Dr. Halsted when he was there in 1913, but whom he did not bring back to America.

Mrs. Halsted at Southampton with the Dogs

X

THE SURGICAL STAFF

Dr. Halsted, in his letter of July 14, 1922, to Dr. Welch, says, " I should be sorry to have it forgotten that I initiated the operative courses on animals. Some were held in your autopsy room, but most of them in a room allotted to me by Mall." In a second letter, also from High Hampton, dated August 3, 1922, he says, " Courses in experimental surgery were given to the first class in their third year (1895). One of the inducements offered to Cushing to return to us was the transference of these courses to him. Very soon after he joined our staff as interne I asked him to assist me in my experimental work and urged him to take up the study of the hypophysis." Again, in his paper (Ann. Surg., Phila., 1922, XXXVII, 356), he says in a footnote, " In our laboratory operative courses for students of the Johns Hopkins Medical School, the leading topic from the time of the introduction of these exercises in 1895 up to the present year has been intestinal suture. I embrace this opportunity to express my indebtedness to Harvey Cushing, for thirteen years my brilliant assistant, for his zeal in elaborating these courses and placing them on such a substantial basis that they are now regarded as one of the dominant features of the surgical curriculum for the third

year medical students at the Johns Hopkins University and are being adopted by other medical schools of this country."

Cushing,* it appears, began teaching operative surgery in 1901 on his return from Europe, and in 1905 had his students publish descriptions of a number of illustrative cases. He says that the course was originated four years before this publication and describes the methods employed. In a later paper Dr. Cushing describes in detail the conduct of the course which he elaborated greatly over his first plan. In that year we built the Hunterian Laboratory of Experimental Medicine and in his half he carried on for years this course.† After 1912, when he left, Dr. Halsted took it up again and then, some years later, it was taken over by several of his assistants, Heuer, Dandy, Goetsch and others.

If an attempt is here made to describe Dr. Halsted's relations with his assistants it must be done as from an outsider, never for long connected even in a minor capacity with his staff. But there are advantages in this, for all these men are still active and while the opinion of an outsider is of no interest to them, any transcription of the comments actually made by Dr. Halsted in his letters might cause suffering or undue inflation.

*Cushing: Johns Hopkins Hosp. Bull., 1905, XVI, 179, 1906, XVII, 123.

†In 1905 the Trustees of the University set aside fifteen thousand dollars for the building of the Hunterian Laboratory, which Cushing and I planned. Half of it was devoted to experimental operative surgery, half to experimental pathology.

Very few men were taken on the staff who had already had some surgical training elsewhere. Finney, Bloodgood, Cushing and a few others came in this way from other surgical clinics and in his later life he formed the plan of exchange of his assistants with those from European clinics, but most of the assistants were graduates of the Medical School who worked up from interneship, through stages as assistant resident, to become resident surgeon in the hospital. After this plan became established through the appearance of successive graduating classes, there was always a group of internes who acted as junior assistants and from them were chosen most of those who were to go on through the long apprenticeship. But, even so, other men were sometimes introduced from without the school. Recommendation from other surgeons seems to have had rather more value in Dr. Halsted's eyes in later years than before, but advance in the line of promotion was notoriously uncertain for most of the men. It is true that he formed his opinion as to capabilities of some men very quickly and with these, at least in his later years, he had a short talk assuring them of what he intended as to their future and in this way setting their minds at rest as to uncertainties and allowing them to plan their work in peace. With those whom he did not intend to keep on the staff he had no such conversation, and they never knew where they stood.

This is brought out in the following letter from Rienhoff, later one of the residents, written in re-

sponse to a request for his recollections of Dr. Halsted, and is so lifelike a picture that I must quote it.

I applied to Dr. Halsted for a position on the surgical staff. My experience and conversation with him that morning have been indelibly impressed on my memory. He appointed a time for me to come to his room and when I arrived asked me to take a seat. Taking out his cigarettes, Pall Mall, in his customary manner he lighted one but did not offer one to me. He never offered a cigarette to any member of the staff when in his room, although he smoked incessantly himself. He explained that he preferred to put me on the staff, as interne in the house rather than in the laboratory of experimental surgery.

He went into great detail to explain to me that he had understood from you that I was interested in working in the laboratory and that he had every intention of keeping me on later if I worked hard and carefully, and of having me follow into the Residentship. It interested me very much that he had planned things so very far ahead and I was convinced that if I attended to my business, my chances of being trained to the Residentship were good. He relieved my mind of any apprehension about "getting on," and put me in a position where I could spend all my time in working and need not worry about the next year. I know that he had a similar conversation with two others of his residents. It is true, of course, that the men he did not care to keep had no interview with him on the subject as he would not permit it. He made up his mind in these three instances at the very beginning of our hospital careers, and from then on these men were given advantages in assisting and time to work in the laboratory that other men did not receive.

At another time he called me up to his office, as he was interested in some experiments I had just finished, and for the first time in the history of the Resident Staff offered me a cigarette, but I was so surprised that I did not take it.

The men, as he studied their characteristics, seemed to fall into three groups and he deliberately emphasized these divisions and took advantage of them even to the extent of deciding the young man's career for him. There were those who were obviously adapted to a career in general surgery, skilful at the operating table, with a sort of humanity that made them well suited to cope with all the various catastrophes that involve their fellow men and may be averted by surgical means. Such were Finney, Mitchell, Follis, Heuer and several others and these were his mainstay. Upon them he could always rely in every difficulty and in every press of work.

In another group he recognized less general and more closely specialized abilities which could be most successfully employed in some narrower field, and these men he pressed into the field which, to him, seemed best suited to their talents. He was rather inflexible about this, and some of the men at first felt a little doubt as to whether the career marked out for them was, after all, what they would have preferred. Crowe tells me that although he had planned to follow Dr. Cushing when he left for Harvard and devote himself to the surgery of the brain, Dr. Halsted persuaded him to consider the possibility of studying laryngology and sent him to Dr. Welch, who told him that he also felt that that was the best thing to do. Very unwilling, and knowing nothing of laryngology, Crowe agreed and was put at the head of a department of otology and laryngology

from which all former appointees had resigned. His success, however, shows at least the perspicacity of Dr. Halsted's choice of men.

In this group it is only necessary to mention Cushing, Young, Crowe and Dandy, although they are also examples of the third group.

In the third group were the men whom he chose to be his own associates or assistants in carrying out the experimental work in some special problem in which he was interested—and it was generally with these that he had his reassuring talk about their future. It was really a great privilege for them to be so closely associated with this eager, searching enthusiast, and of course it implied their ability at the operating table because so often it was entrusted to them to apply the results of the experiments upon animals to the patients whose condition had made necessary the experiments. There is a long list of these—Sowers, Gatch, McClure, Goetsch, Reid, Grey, Holman, Reichert and Rienhoff.

It would be impossible to discuss here the careers of all these men, many of whom have become distinguished surgeons and occupy the prominent places in the clinics of surgery throughout the country.

Dr. Finney, who came at the opening of the hospital from the Massachusetts General Hospital and took charge of the outpatient or dispensary service in surgery, filled this position until 1914, aided by a whole series of associates among whom Iglehart, Walker, Fisher and Follis served for many years.

Dr. Finney through all this time was active in the operating room, too, and for several years after Dr. Halsted's death was acting head of the Department of Surgery. Another book will some day be written to tell of all that he has done, and every surgeon knows of the character of his work. Dr. Halsted always depended on him in all the actual work of the hospital, but not in his experimental work. The two men had a different training and always a different outlook on the whole subject.

Dr. Bloodgood, who came in 1892 from surgical work in Philadelphia to join the staff, was resident surgeon for several years. At an early stage in his service on this staff, Dr. Halsted suggested to Bloodgood that he should undertake in more systematic fashion than had hitherto been done, the study of the pathological anatomy of all the tumors and other tissues removed at operation, and in this way, in a sense, shaped his career. For Dr. Bloodgood began to work in the Pathological Laboratory and after a time gave courses in surgical pathology to the medical students. These have been maintained by him up to the present day and the carefully preserved material, systematically arranged, studied and indexed, has reached colossal proportions and has been the basis of many valuable studies. It was this which allowed Dr. Bloodgood to make the analyses of the cancers of the breast and of various other pathological conditions which have served as a solid foundation for so many of Dr. Halsted's own contributions.

Dr. Halsted, in many of his papers, finds himself saying something like this: "If our operation for the radical cure of inguinal hernia has improved it is due in no small measure to the arduous labors of Dr. Bloodgood," or, "Thanks to the most persistent efforts of my house surgeon, Dr. Bloodgood, the results of all the operations have been ascertained."

In recalling his early experiences, Dr. Bloodgood remembered the surprise and interest that he felt in the contrast between the surgical methods of Dr. Halsted's clinic and those to which he had been accustomed, and wondered at the extreme precision and refinement of surgical technique. He had seen no such practice in the clinics of any of the best known American surgeons of that time, although Senn, Fenger and Lange approached it, and in 1893, when he spent most of the year in visiting the surgical clinics of almost all the countries of Europe, he felt that he saw nothing that remotely compared with it. After-years have, of course, brought a great perfection in this respect to the German and other European clinics, but in this country much of the actual recognition of what is necessary in operating must be credited to Dr. Halsted's own thought in the matter.

Upon returning to the operating room at the Johns Hopkins Hospital, Bloodgood was once more impressed by the same outstanding features in the work of the professor of surgery that have been lauded by others. Dr. Halsted was at home in those operations

that required a very exact knowledge of regional anatomy, and in which he held in mind throughout, a rather complex plan of action, as was true of the hernia and cancer operations. He was not so happy in the operations upon the gall-bladder and ducts; as for those on the stomach and intestines, he practically abandoned them to others. When he began to operate on goitres—a field in which he became very expert—he encountered in his first case an instance of extreme over-distension of all the veins, and in this his customary sang-froid was put to the last test. Later he managed such cases with very much better control of hæmorrhage, but it seems a pity that he could not have lived to enjoy the safety and ease of operating upon goitres that is available nowadays with the preliminary iodine treatment.

He was thus rather a specialized surgeon in his later days, although the subjects in which he specialized are really those that form much of general surgery. It is interesting to see that in the thousands of letters that remain he was consulted chiefly concerning those conditions for which he had shown special interest, and asked to operate in just those cases. Indeed, he assigned other fields so carefully to his assistants that at one dinner, which they all held for him, he said in his speech that practically every opportunity had been taken from him, and that the only thing left for him to treat was osteomyelitis.

Then, in 1897, came Harvey Cushing who became resident surgeon in 1898, and remained in that post

until 1900 when he went to Europe for a year. He was associate and associate professor, however, for some fourteen years after that. He had the experimental type of mind and was more akin in that respect to Dr. Halsted than many of the others. His artistic ability and his technical skill appealed to his chief and he was perhaps the first to be directly urged to enter upon a special part of surgery. His epoch-making work in the surgery of the nervous system has fully justified the choice. Dr. Halsted's relation with Cushing is difficult to estimate. They were both forceful characters and Cushing during his long service in Dr. Halsted's clinic, both as Resident Surgeon and later as Associate and Associate Professor, was always very independent and developed not exactly as a disciple, trained in every detail by the master, but really much as he might have developed somewhere else. He absorbed, of course, all of Dr. Halsted's fundamental principles of surgical practice in the treatment of tissues, hæmostasis, the maintenance of asepsis, etc., but he never interested himself in any of the problems that most closely concerned his chief. Dr. Halsted admired his brilliance and his many accessory talents and always felt for him the respect that these things commanded, but they were never very close to each other and there was always a certain barrier of formality between them. This might seem to suggest that Cushing was much more mature from the start than most of the other assistants, and probably this was true and may

explain the whole situation. Afterward, when he went to Harvard, Dr. Halsted always wrote to him as to a contemporary, and never as to the much younger and more dependent members of his "school."

Young, who was assistant during 1897 and 1898, was the second to be turned into a special channel and in 1898 was put in charge of the dispensary for genitourinary diseases. His brilliant career in the years that followed is generally known and once more justified the foresight of Dr. Halsted.

Mitchell, who was on the staff from 1898 to 1901, became resident house surgeon in 1900. He was of the type of Dr. Finney, with almost purely clinical interests and destined for a long, successful career in operative surgery. There followed a succession of men of rather similar tastes as resident surgeons or assistants—Follis, Tinker, Yates, Sowers, Watts, Bush, Miller, Churchman, Remsen, Gatch, Fisher and Heuer. From this time on with Sowers, Heuer, Gatch, Crowe, Dandy, Goetsch, McClure, Grey, Reid and Rienhoff, Dr. Halsted devoted himself more intensively to his experimental work, drawing these men one by one under his personal influence, occupying them with the studies in which he was interested as enthusiastic assistants, and in each case directing with great care and foresight their future career.

Follis, who was very close to him almost from the time of his appointment to the staff in 1900 after his interneship, tells me of his dependence upon his assistants. Unlike some surgeons who seem to prefer

to operate almost alone, he wanted all the assistants that could take part in an operation but they must be silent and unobtrusive. The man who was misguided enough to attempt to attract his interest by any undesired activity in an operation, or elsewhere by persistent courtship, as some young men do, most certainly sealed his own doom as far as his prospects of promotion were concerned. The professor was a relentless judge of young men and he must have recognized a genius in such an assistant to have kept him on the staff for another year. The slightest departure from honesty brought down even more prompt and complete disaster. One young man, when asked how a certain patient was that morning, replied that she was doing very well, but when a little later Dr. Halsted went to that ward and found the patient very ill the assistant had to admit that he had not visited her that morning. The service is heavy and the assistants so busy that the mere failure to see this patient during those hours might readily have been forgiven, but this young man left the staff at once.

There was nothing in the least despotic about Dr. Halsted, but he was not soft. His courtesy was perfect under all circumstances and of course he never raised his voice nor spoke a harsh word, but he could look over his glasses at one, a little out of the corner of his eye, in a way sufficiently effective to keep the operating room in a state of constant anxious tension. He could administer a rebuke in

the most quiet conversational tone but with such slashing sarcasm as made the offender cringe. It had always been so from his Yale days, and through his New York days, and even yet some of those who remember him smart under some such recollection. But it seems that it was the manner in which he spoke and his oblique glance, rather than the words that cut so, for it has not been possible to write down any particular remark that looks very venomous on paper. However, it is the same with his witty remarks. One remembers the delight with which we listened to his after dinner speeches on several occasions, consumed with laughter over his shrewd humor and his neat twist of ideas, and especially his "*Schadenfreude.*" But nobody can remember anything that does not sound flat when written down, and it must have been his way of saying these things that so stirred us to mirth. The few notes that remain, written in preparation for his set speeches, are not humorous at all, and all the sparkle and real humor must have come with the brio of the moment. But they were very amusing speeches.

The sort of thing he enjoyed commonly ended in the discomfiture of some one else, as when in a committee meeting one of the younger men was explaining rather impressively the advice he had given to a group of millionaires who wished to organize an educational institution—"I said to them, get a man like Dr. Welch and—," but Dr. Halsted broke in

"Why not get several of them?" upon which the report ended in confusion.

He did not stay all day at the hospital during these years (1901-1905), nor did he work especially in the Hunterian Laboratory. Indeed, he often remained away for days or even a week or two at a time, and it seemed rather an inactive period, although as it proved, it was to prelude a longer period of great activity. He was very retiring and no one knew exactly what to expect of him. He had stopped operating on hernias, but a new idea might occur to him and for weeks or months he would operate on all the hernias that came to the hospital, intent on trying out this new improvement on his old operation. For such periods he would work with new enthusiasm and energy. Follis almost repeats Bloodgood's words when he says that it was in such operations as involved his wonderful knowledge of the details of regional anatomy, and his skill in the care of tissues that he excelled.* Abdominal operations in general did not appeal to him and although he occasionally operated in a case of appendicitis or of obstruction of the ducts by gallstones, his real field was not there and he was even a little awkward, requiring always a much longer incision than some other surgeons. His interest in intestinal anastomosis was in the

* A new surgical building was opened in 1904 and some of the former members of the staff returned for the honor of assisting at the first operation in the new amphitheatre. The picture shows Finney, Cushing, Young, Mitchell and Bloodgood. Miss Crawford is Head Nurse.

Dr. Halsted's First Operation in the New Surgical Amphitheatre in 1904

principles concerned and he never devoted himself to the study of such conditions as especially require that kind of operation. He left to Dr. Finney all the problems of operating on the stomach and most of the intestinal obstructions that required anastomoses.

After Follis, as residents came Sowers, Miller, Churchman, Remsen, Heuer, McClure, Dandy and Reid. Upon these in turn there rested great responsibility and they were as towers of strength to the professor for they were often called upon to operate or, especially in the case of Heuer, to take his clinic and teach the students. For Heuer and Reid he had a very special affection and trust—they worked together as they have done ever since although Heuer preceded Reid by some years, and it was to these two that he turned at last when he had to undergo an operation. It was Reid especially who worked with him on the surgery of bloodvessels and in some other fields. For Grey, who died in the epidemic of influenza in 1918, he predicted the very brightest future and in one letter deploring his death he said that he might well have been chosen as the successor to his chair, had he but lived. Dandy always shone through his most ingenious technical and anatomical discoveries in the surgery of the brain, and Dr. Halsted never wearied of commenting with admiration upon his pneumoventriculography and his studies of hydrocephalus. With Holman and Reichert he pursued his studies of the surgery of the arteries after

Reid left and they have carried them on brilliantly. With Rienhoff he continued his interest in the surgery of the thyroid and there, too, the stimulus has survived him and Rienhoff has contributed much to the knowledge in this field. Dr. Finney, carrying out after his death Dr. Halsted's wishes, appointed Holman, Rienhoff and Reichert in turn, to the much coveted residentship in Surgery.

Dr. Halsted held to his idea of having the assistants of European surgeons appointed temporarily on his staff and Schlaepfer came from Clairmont's clinic in Zurich and profited greatly by his year in Baltimore.

When the war came on and a medical and surgical unit was sent to France, under Dr. Finney, Heuer headed the surgical side and did brilliant service there with most of the other members of the staff to help him. Dr. Halsted felt himself too infirm to go abroad, but shorthanded as he was left, the strain must have been still greater here. Dandy and Reid and Taylor were left and they were much overworked. There was great rejoicing when the others returned hale and hearty in spite of their arduous service at the front.

The following extracts from a letter give an idea of the very serious consideration that he always gave to the future of his assistants:

> Your talents and, I presume, your tastes also, fit you for a university career rather than for a largely operative one. Great drafts would be made upon your administrative ability as Director of a Department wherever you might happen to

locate. The next ten years of your life should naturally be the most fertile ones if the conditions are favorable, and there is probably nothing from which in later years you will derive so much satisfaction as from the contributions of yourself and your assistants to science. I know this not only from my own experience, but from intimate conversations with the world's leading surgeons during the past forty years. You will take little pleasure in the contemplation of any dexterity that you may have acquired in operating, for operative skill is common and, in this respect, you will surely find yourself equalled, if not excelled, on every hand. Your chief endeavor, therefore, should be to place yourself for the next ten or fifteen years in an environment best suited to the development of your particular endowments and to the preservation of your health.

In the building up of a school you will have to sacrifice yourself to the interests of the school and of your assistants. This, in itself, is a fine, perhaps the finest ambition. And you will be the only one able, even approximately, to estimate the extent of the sacrifice and the effects of the impress of your suggestions and teachings and example. The Head of a Department in a school should give his problems freely to his assistants (and I have been happy to note that this is your tendency) rather than to technicians and salaried students and assistants, the results of whose work would redound to his glory.

To Dr. F. H. Baetjer, who has from almost the very first been in charge of everything that has to do with X-ray work in the hospital, when the American Roentgen Ray Society gave a banquet in his honor, Dr. Halsted wrote the following letter:

DEAR BAETJER:

I have just this moment received the glad tidings of the banquet which is to be given in your honor, and the invitation

to write you a letter which must be there by August 25th. I am not to be denied the satisfaction of trying to add my voice to the chorus of eulogy, even at the risk of singing behind time and out of tune. Out of tune my chant will surely be, for no one—so at least I like to think—can have known a relationship for so many years and so ideal as ours has been. Now that you have weathered the storms and are almost out of call of the "merrymen," I may tell you how anxious your friends have been lest you were lost to them and how they have marvelled at your courage and sustained cheerfulness in the face of what seemed many times an almost hopeless struggle. But this is not what I have it in my heart to say, nor can I convincingly tell you what a joy it has been to me all these years to feel your strong loyal support and tender friendship. Your chief concern has been to aid the physicians and surgeons and students and patients, and you have realized the fundamental importance of systematically attending operations in order to confirm or correct your opinions. The X-ray Department under your masterful guidance has become one of the major features of the several clinics and has contributed in large measure to the renown of the hospital and medical school.

I earnestly wish for you a long and happy voyage on seas ever as untroubled as now they promise to be.

Affectionately,

W. S. H.

XI

SURGERY OF GALL DUCTS AND THYROID

During all these years, and indeed, up to the time of his death, Dr. Halsted was interested in the disturbances produced by gallstones, and in the surgical methods which might be used to alleviate or cure these conditions of obstruction. It will be remembered that in 1881, long before anyone had clearly worked out a proper technique, he had, in the middle of the night, operated alone on his mother, removing a quantity of gallstones from a much inflamed gallbladder and prolonging her life for two years at least. His actual work which could be published came later however, and his first paper was in 1896. In other papers and discussions, he evinced his continued interest, although it does not appear that he himself performed a great number of such operations. He did devise a small hammer like instrument, over which, when the head of the hammer was inserted into the incision in the common duct, he could with ease perform the suture to close that incision. In 1899 he read a rather long paper before the Suffolk District Medical Society in Boston, describing his observations and operations in several cases, and this was followed by an interesting discussion. In 1901 he was greatly impressed by the case of acute hæmorrhagic pancreatitis in which Opie

demonstrated the terminal obstruction of the papilla of Vater by a small gallstone with backward flow of bile into the pancreatic duct, and wrote a paper about it. After that, from a number of illustrative cases, he began to realize the significance of a long continued loss of bile through open drainage, in causing an extreme depression and weakening of the patient. He went through this himself in 1919, after the first operation for the removal of a gallstone from his common duct.

It was before this that he had devised a method of closing completely the incision in the common duct and draining through a tube in the cystic duct, a method afterward described in detail by Mont Reid, who used it in many operations. With that plan the drainage could be accurately controlled, but it could not be used in Dr. Halsted's own case on account of the anomalous position of the cystic duct.

Later still, he became greatly interested in the remarkable work of Rous and his associates on the fundamental principles concerned in the production and secretion of the bile, but he never had an opportunity to make any application of their results.

On the whole, his work on the surgery of the bile passages is chiefly significant for the idea of the little hammers, over which an incision could be sewed up as over a darning ball, and for the plan of controlled drainage through a tube in the cystic duct, which allowed the exact closure of the incision in the common duct and the relief of any excessive pressure

in that duct which might arise after the operation. It does not seem to cover so widely the variegated field of gall duct surgery as does his work in connection with some other diseases. But who can exhaust any field in nature with any mode of attack?

One feels that his interest was tinged a little by his own outlook—he always felt that he would die at seventy, and he knew that his mother had died of final obstruction of the common duct, and probably foresaw in some vague way his own fate.

It was about 1903 or 1904 when Dr. Halsted began to interest himself especially in the surgery of the thyroid gland, reviving in these operations the old fascination it had had for him in the days of his experiments, before the opening of the hospital. Since Baltimore is not in an area where goitre is endemic, it was particularly the treatment of exophthalmic goitre that occupied him. This, of course, occurs everywhere, and patients were soon sent to him from all parts of the country for operation. We studied the tissues removed at these operations, and realized the nature of the process as something very specific, and different from that found in ordinary goitres. Those produce an awkward growth of the thyroid into great masses which can obstruct the trachea and interfere with breathing, but they do not cause the distressing nervous disturbances that come with the exophthalmic type. German surgeons,

particularly Billroth, Kocher and Mikulicz, had been removing goitres for a long time with varying success, and with various ingenious devices for avoiding serious or fatal hæmorrhage. These were all sorts of goitres, particularly the great masses that occur so commonly in Switzerland and Austria, but there were some cases of exophthalmic goitre. They removed a part, occasionally the whole of the organ, and began to realize that there were other evil effects than hæmorrhage. They observed hoarseness and changes in the voice, and even more serious results from injury to the recurrent laryngeal nerve. They saw curious changes in the whole personality of the patient, with degradation of mentality, progressing slowly until the man who was formerly bright and alert, became little better than a brooding imbecile. Sometimes the operation was followed quickly by twitchings or convulsions, almost epileptic in form, which might lead to death, and sometimes after operations in cases of exophthalmic goitre there might be great intensification of the symptoms, and the patient would die with what was thought to be an intoxication from the thyroid.

All of these things were puzzling in the extreme, but it will suffice here to say that Kocher recognized the fact, now universally understood, that too extensive removal of the thyroid tissue results in a mental and physical deterioration, quite like that observed about the same time by Gull and others, when disease has caused the destruction of the thyroid. He called

it " cachexia strumipriva," Ord called the same condition, as described by Gull, " myxœdema." It was impossible for them to explain the convulsions and twitchings that came on rapidly, other than to regard them as acute forms of the same condition. It was only later that this became generally known as the result of the destruction of a quite different tissue—that which makes up the four small parathyroid glands—and was called " tetany." The last, the intoxication which sometimes followed with fatal results the operation for exophthalmic goitre, although never that on other types of goitre, remained unexplained. Even now, although it can be avoided, its nature is not clear.

Much experimental work directed toward the better comprehension of tetany, and the exact function of the parathyroids was going on in the pathological laboratory when Dr. Halsted began to operate on exophthalmic goitre, and he became greatly interested in one or two aspects of this. By that time the absolute dependence of tetany upon the loss of function of the parathyroids was well established, and he realized that any operation on the thyroid must be so planned as to ensure their protection, not only from direct injury, but from any interference with their blood supply. Therefore he was interested in their exact position as shown in a long series of dissections made at autopsy, and later in a study of their blood supply made by Evans. As early as 1907, in discussing Dr. Charles Mayo's paper, he described his

plan of removing a part of each thyroid lobe, carefully leaving the posterior portion with the blood-vessels and the parathyroids untouched. Mikulicz had a somewhat similar plan of removing parts of each lobe, but it seems not to have been so precisely designed to save, deliberately, and with a clear view of the whole situation, the circulation of the parathyroids. Later in his "Operative Story of Goitre" Dr. Halsted describes in minute detail the successive steps in his perfected operation. From the illustrations it looks simple enough, but the enormous distension of veins all over and about such a thyroid, and the extreme delicacy of their walls, made the risk of great hæmorrhage a terrifying thing. Indeed, as we have said, even he found this demoralizing in the beginning, but the control of hæmorrhage was his forte, and it soon lost its terrors for him.

But there were cases in which tetany followed the operation, and this stirred his interest in attempting to transplant parathyroid glands. In the actual cases of tetany, he resorted to feeding dried and fresh parathyroids from the slaughter house, and thought that he saved the life of one patient, at least, by this means, although he abandoned the parathyroid feeding when it was found that salts of calcium would abolish all the symptoms of tetany. One can hardly feel sure that the improvement of the symptoms was ever altogether due to the feeding of those beef parathyroids, for in experimental tetany even when given in huge doses they did little. Probably there was a

Photo by John H. Stocksdale

Dr. Halsted in 1922

good deal in the power of suggestion, for the patient seems to have survived, and it becomes even doubtful whether the symptoms were at any time those of tetany. How interested Dr. Halsted would have been in the extremely powerful extract of Collip with its instantaneous effect!

From 1906 to 1908 he carried out a great many experiments in dogs, to determine whether it is possible to transplant or implant parathyroid glands. At first he attempted to graft them into the thyroid and then into the spleen, but later, because of the work of Leischner, into the abdominal muscles. Briefly, he found that it seems to be impossible to transplant with success a parathyroid gland from one animal to another of the same species. Even auto-transplantation, that is the grafting of the organ into another part of the body of the same animal, was successful only when a deficiency or need for this tissue was produced by removing the remaining glands.

Dr. Halsted was greatly impressed by this discovery, and expressed it as a law—" the following law seems to exist; namely that unless considerable deficiency in parathyroid tissue has been created, the autografts do not live." He felt that the tetany following operations on the thyroid in human cases is more often due to interference with the blood supply of the parathyroids than to their actual removal, and says in the same paper, " So too, in the human subject in which, first one, and then later, the

second thyroid lobe is removed, the parathyroids, if reduced to the condition of autografts, would be more likely to die on the side first operated upon than on the side of the second operation, since those on the second side would be more likely to live because a deficiency had been created.''

He was able to demonstrate very clearly in one dog, that life and health had been dependent for many months upon the existence of a transplanted parathyroid, since when this minute graft was removed, the dog developed tetany and died. The study resulted in careful efforts to reimplant parathyroids removed accidentally, but of course the importance of this was realized to be slight, since there was only a moderate deficiency to promote their growth, and the paramount importance of protection of the circulation in all four glands remained the essential feature of the operation. Whether the failure of the graft to survive really depends entirely upon the degree of deficiency and the consequent need for that tissue, and not upon the great sensitiveness of the parathyroid tissue to the temporary deprivation of its blood supply, remains to be seen. The law was, after all, established on an extremely small number of experiments.

Thus the work on thyroid and parathyroid was, so far, essentially a consideration of the technique which would permit satisfactory control of hæmorrhage on the one hand, and satisfactory preservation of the circulation of the parathyroids on the other.

No serious effort seems to have been made toward the transplantation or implantation of parathyroid tissue in human beings. But the protection of the arterial circulation of the parathyroids by "ultra-ligation," that is, by tying the thyroid arteries beyond the point at which the parathyroid arteries are given off, was most carefully detailed.

Dr. Halsted's long monograph, The Operative Story of Goitre, appeared in 1920 and is a careful study of the whole history of surgical efforts to relieve the discomforts and disabilities that may threaten the lives of those suffering from the many kinds of disease of the thyroid. He recounts in detail the dangers and terrors of such operations, and the gradual evolution of methods by which the major difficulties, especially resulting from hæmorrhage, were overcome, and finally he gives a description of his own method of operating which had proved so successful.

In another paper, published in 1914, he says that he had at that time operated upon 650 cases of exophthalmic goitre, and this figure must have been greatly increased before his death. Since the untoward results were not many, he must have afforded unspeakable relief to a great number of people. Sometimes these results were almost marvellous in the complete restoration of the health of the patient, but the letters from many of the others show that relief was not complete, although their lives were prolonged and became tolerable. He himself was well

aware of the uncertainty of the outcome and of the mystery that surrounded it, well aware, too, of the weight of our ignorance as to the nature especially of exophthalmic goitre, but in his writings he says little about this. Having found that some benefit, sometimes complete cure, results from the removal of part of the thyroid, he devoted his energies to the perfection of the operative technique to serve that end. Even in his long monograph he writes very little about the nature of the disease, or about the speculations upon the function of thyroid and parathyroid. In his Harvey Lecture on the relation of the thymus to Graves' disease, he permits himself more of the speculative attitude. There he reviews the scant literature on the changes in the thymus found to accompany the thyroid alterations, and the few operations in which portions of the thymus have been removed together with part of the thyroid. The results in restoring the patient to health were sometimes surprisingly gratifying, and his speculations led him to take a great interest in the ideas of Garré, Hart, Klose and others who felt that the thymus plays a prominent part, if not the primary rôle in the production of exophthalmic goitre.

For years he proceeded to treat the disease, in part at least, by exposure of the thymus to the X rays, and in some cases, after excision of the thyroid, the X ray treatment of the thymus produced prompt and striking improvement in the persistent symptoms. His last paper on this was in 1914, and

none of his staff seems to have carried on this work any further.

The whole problem of exophthalmic goitre is still wrapped in obscurity. Some advances have been made which render the operation far easier and less dangerous, and obviate the risk of the peculiar intoxication which used to be so dreaded. Dr. Halsted's contribution lay in his perfection of the operative technique as far as control of hæmorrhage and preservation of the circulation of the parathyroids are concerned, but he did not especially advance our understanding of the nature of the disease. Through all the earlier part of this work he had the assistance of Follis, Sowers, Miller and others. Goetsch took a great interest in thyroid surgery during his years in the hospital and afterward. Dr. Halsted had a very high regard for his work and especially esteemed his studies of the mitochondria in the cells of thyroid adenomata, and of the effect of injections of adrenalin in the diagnosis of exophthalmic goitre. In recent years Rienhoff, who as Dr. Halsted's assistant was stirred to an interest in these problems, has carried the work to much higher levels.

XII

HIGH HAMPTON

It was a rather curious life that they lived in the mountains of North Carolina. After the estate at Cashiers in Jackson County came into the hands of Dr. and Mrs. Halsted they built a cottage in addition to the old lodge which Christopher Hampton had built in 1840 and in many ways made the whole place more habitable. Its natural beauties were great—they could look out on Chimney Top and Whiteside Mountains and there was a beautiful little lake with a stream quite near the house. Splendid old trees stood near and there were woods and streams as far as one could see, for the estate had more than two thousand acres. It was Mrs. Halsted's delight to smooth and tend the flowers and hedges and the garden and even on a much larger scale to raise great crops of hay and potatoes and other things, as some of her letters have already shown. When Dr. Halsted arrived at this quiet retreat sometime in midsummer he found everything blossoming under her care—and for him there began a period of complete peace with books and his dahlias, his telescope and long walks in the woods to interest him.

Mrs. Halsted was the energetic one in this situation. With the gardener, Bradley, and several

The Newer Cottage at High Hampton

The Living Room at High Hampton

" hands " in the fields, as well as one or two colored servants in the house she was much occupied. She even established a sawmill on the place. They had a good many visitors from time to time, and it is the permanent regret of those who failed to accept their invitations that they missed this experience which others found so delightful. Many of the family spent days or weeks with them and the "Aunties " were generally there.

The people round about looked up to them with the greatest respect and did their best to be extremely polite. There was a kind of rough courtesy from the shopkeepers of Lake Toxaway which had in it something quite apart from mere business. One man writes to Dr. Halsted, when Mrs. Halsted was in Florida, " I think the madam wants some corn, and I had suggested that she wait for the market to come off. Now I have a car of white milling corn at $1.25 a bushel. . . . . Mrs. Halsted did not give me her address in Florida and for that reason I am taking this matter up with you. Sorry to bother you and with kind regards, I am, yours truly." So Dr. Halsted orders 75 bushels of corn and later, when Mrs. Halsted comes back, she orders from the same man 50 bushels of corn, 30 bushels of oats, one ton of cottonseed meal and one ton of shorts. They send orders to Peter Henderson and Dreer for seeds of every kind of vegetable. There is a horse to arrange for and Dr. Halsted writes, " Dear Mr. McGee: I presume you have heard that our horse, Ned, has

died. He broke his shoulder in the early fall and succumbed to an abscess which formed about the first of the year. Mrs. Halsted and I will appreciate it very much if you will remember our predicament and in case you should know of a gentle horse suitable for buggy use and also for work on the farm will you kindly let me know. Naturally we should like to have a respectable looking animal.

Mrs. Halsted sends her kindest regards to you and Mrs. McGee and so do I.''

To Dr. Howard he writes about hydrophobia which seemed to prevail, '' it is a pity that the State health departments cannot compel the sacrificing of the bitten dogs. In our mountain wilds no attempt is made to enforce laws; even murderers are always acquitted.''

Mrs. Haskell, Mrs. Halsted's sister, writes me: '' Personally I think he did not much like the mountaineer—his ignorance, superstition and religion were almost unintelligible to him and he did not enter into the racy shrewdness and humor that is often theirs . . . . perhaps they did not show it to him, he was of another world, an ' outlander,' a ' furriner.' But for the ill, he showed a large sympathy and helpfulness.''

Indeed he did show them kindness and there remain ever so many letters from those mountain neighbors anxiously asking his advice—always asking how much it would cost to go to the hospital in Baltimore, because the village doctor does no good—

and these almost always followed by other letters full of really touching gratitude to him for having paid their fare and often their hospital bill, besides operating on them for nothing and giving them for days his most careful attention and sympathy. Such a continuous hymn of gratitude it would be hard to find in any other collection of letters, although it is by no means all from these mountain folk, but from people of every station in life who felt that they owed to his skill and particularly to his devoted attention, their recovered health and perhaps their lives.

One of the mountain letters reads:

Dear Doc, I will write you to tell me if that would be a dangerous opperation so write me at once and tell me, and tell me how much it would cost me to Baltimore and back to Lake Toxaway. I will write you a few symptoms I have.

1 sick headache
2 spit up bad stuff
3 pain in side and breast
4 numb hands
5 dizzy spells
6 spells about every week that I can hardly see, and acid headache right after. You know what I told you while I was over there, so write me by return mail if you can. I want to get well if I can but I see a poor chance so I will close.

He was by no means unaware of their shortcomings but still up to a certain point he forgave them. In a letter to Dr. Curtis Burnam he writes, "In the mountains of North Carolina there is an old woman whom I have known for twenty-five years.

She has a carcinoma of the skin of the forehead which is now extending into the eyelid. I hardly think that it has entered the orbit. She is absolutely without means, except a ten dollar pension which she receives as the widow of an old scamp who pretended he was in the war, but was not.

" Would it be agreeable to you and Dr. Kelly to treat her with radium? I hesitate to ask this great favor, but the suffering of this old woman is beginning to be distressing, and it seems a shame to allow the cancer to enter the orbit. The growth can be removed surgically, I am quite sure, but she will not consent unless I can assure her that there is absolutely no danger."

He then writes to the old woman saying that he will pay her board and other expenses. Later, when she had been treated and had returned home practically completely cured, he writes again to Burnam. " She is trying to have her pension raised because of the carcinoma. It is an outrage I think, but she has a cousin in Congress who is pushing the matter for her. Her husband was never in the war, but when drafted hid for six months in a cave in North Carolina. About the close of the war he was wounded in a drunken brawl and on the strength of this wound got a pension. It is now passed on in increased form to his widow."

They, for their part, never hesitated to invite his charity or even to ask for money to help them complete a house or something of the sort. They asked

his advice about all sorts of things and greatly respected his wisdom. And they knew that if they were sick they never asked in vain for his best and most generous services.

The business of the farm interested him much less than it did Mrs. Halsted, but she was often ill and there are many letters to Douglas Bradley who acted as gardener and general manager, giving him detailed orders in her name as to the ploughing or planting of this or that field, the hiring of men, the cutting of wood for their open fires, or the storage of ice—details as to the killing of hogs and the exact manner of curing hams and bacon and wrapping them in paper and cotton were given, and in other letters there is a note of rejoicing over succulent spareribs or chine sent up to Baltimore. Bradley is advised to buy so many chickens and to sell a cow or a calf, and everything is accounted for exactly and cheques sent to settle each bill. But it was always Mrs. Halsted's pleasure and interest to manage all this and it was rarely laid upon Dr. Halsted's shoulders. It was rather difficult to get good servants to go up into the mountains, but they seem to have succeeded pretty well—usually with a colored cook and house servants who came from Columbia or Savannah. The people in the mountains know nothing of cooking nor of the niceties of housekeeping.

Dr. Halsted's own pleasure was in the brooding peace that lay over the valley and its woods, and much of his time he spent in lonely walks. And then

there were his dahlias. He delighted in these flowers, perhaps especially because the mountains of North Carolina seemed to afford an ideal climate and soil for their growth, for they flourished there beyond the wildest dreams of those who tried to grow them in other places. They were planted in little plots with grass paths between so that one could walk among them and they grew to such heights that one must bend them down to see the flowers. He was in touch with all the well-known growers, and orders for long lists of field-grown clusters of bulbs (not pot-grown tubers, nor sprouted ones, nor plants) were sent, with warnings to make no substitutions, to Carter Page in London, Charmet in Lyon, Cheal in Crawley, Goos and Koenemann in Niederwalluf, Rivoire in Lyon, and many others. And these ever new varieties bloomed in such glory and profusion that the place was famous. He formed friendships with other enthusiastic experts, such as Mrs. Stout of Short Hills, who wrote to consult him about the behavior of dahlias in his part of the country for her book, and Miss Thompson, of the Department of Agriculture, who went to High Hampton to visit him in his garden.

He was not especially interested, it seems, in grafting or cross fertilizing the flowers or in any of the methods used in the production of new varieties, but this was perhaps because he had so little time to devote to them. It is hard to imagine that such problems would not have stirred him to most ingenious

experiments if there had been the opportunity to continue from one season the results of the previous one. Instead, he and Mrs. Halsted gave away bulbs in great quantities to the neighbors and to other dahlia enthusiasts and, even yet, the gardens in the whole region are said to bloom with flowers that came from High Hampton.

He writes, " I am farming in earnest and have not even untied the bundles of manuscript. It is better probably to forget about the article for awhile as I was getting tired of it and a little stale. An historical paper is not in my line, I know, and it is funny that I should have become involved in one. We are expecting a lot of company in a week or two and Mrs. Halsted and I are trying to solve the problem of housing all our guests simultaneously." Later, " We are freezing up here. Mrs. Halsted is busy gathering her crops, potatoes and silo corn. About half of the potatoes have been gathered and we shall have apparently about 600 bushels—what to do with them we have no idea. I see that in Germany they are feeding them to cattle. I wonder if anyone in this country has had any experience with feeding potatoes to cattle. Mrs. Halsted thinks they have to be cooked."

Two years later he writes, " My days have been devoted to observing Mrs. Halsted's farming operations and when night comes I usually have only just enough energy to read the papers or some book. Mrs. Halsted has spent the entire day walking the

rows of a ploughed field planting turnip seed through a long horn which she trailed in the furrows. I have had plenty of time for reading, this summer (1920); on the whole I find nothing quite so fine as the writings of Huxley. He is one of the greatest masters of English and never writes twaddle like the brilliant brothers, William and Henry James, or Stevenson or even Swinburne at times."

Mrs. Haskell writes in 1918, "Thank you for starting the little girls. I hope they *are* started but I have not yet heard from Asheville of their arrival. I hope they have not been a tax to you and Caroline. I hear they have followed you about and thought you were as young and frivolous as they themselves," and he answers, "I am so pleased to receive your kind letter today and gratified to know that your visit to the valley was perhaps as greatly enjoyed by you and the girls as by Caroline and me. What fun we had with the flags and maps and with poor old Ned who has broken his leg and will take us no more to the postoffice. We shall have no occasion to pin maps on boards next summer. How wonderful was the windup of the war."

There were many other visitors. Dr. Welch and Mr. Frank Hambleton journeyed together in 1910 to High Hampton and the three cronies enjoyed themselves greatly. The visitors were given one of the two houses to themselves and their memories of their walks and drives and talks were treasured. Others projected visits but never really accomplished them,

to their sincere regret. Dr. Councilman was one of these and Dr. Matas another. Dr. Matas was particularly distressed over his inability to accept the invitation, for his affection and admiration for Dr. Halsted knew no bounds. In his letter he describes most vividly an adventure in a thunderstorm on the top of Mt. Mitchell—a scene of inferno such as Dante could barely imagine—but still he was eager to return to these Carolina mountains. Dr. William C. Lusk did pay them a visit and talked of it always afterward, and one summer Heuer and Guthrie were there for a time.

And now it is an inn, changed as little as possible from the state in which it was left at the death of Dr. and Mrs. Halsted, and one feels that to visit it would be in the nature of a pilgrimage for those who knew him.

XIII

RELATIONS WITH FOREIGN SURGEONS

Dr. Halsted received many visitors from abroad and from this country who were eager to listen to his teaching, and watch his actual work, and he, too, made it his duty and pleasure to visit the clinics of Europe and to keep up his friendly, almost intimate, relations with the greatest of the European surgeons, either by watching and minutely noting their work, or by discussion with them in their hospitals and their homes, or at the meetings of the German Surgical Association.

It may be well at this point to attempt to give some impression of these relations by quoting from their writings or from the long continued exchange of letters. Of course his training had begun in Vienna and in Germany and he was always an adherent of the German attitude toward surgery, in principle, although often critical of particular features of ideas or of technique. It was Theodore Kocher whom he admired, perhaps more than any other of modern surgeons, and with whom he was most closely bound by ties of friendship and frequent association, but he felt a great interest in the school of Billroth, and maintained a correspondence with v. Mikulicz, v. Eiselsberg and others. Later he visited Küttner, and just before the war formed his plan of exchanging assis-

tants with him, so that while Heuer spent a year in Küttner's clinic in Breslau, Landois came for the same period to Dr. Halsted.

In 1913 he greatly enjoyed a visit from Prof. Réné Leriche of Lyon,* and from that time on there existed a warm friendship between the two, and a continuous exchange of letters. Although perhaps not in its proper chronological order (as little of this story really is) it may be interesting to quote here Prof. Leriche's impression of the work of Dr. Halsted in 1914 (Lyon Médical, 1914, CXXII, 1014).

Halsted is the surgeon of cancer of the breast; that is at least what all the world thinks. One might as well say that he is the man of exophthalmic goitre, of parathyroid grafts, of the treatment of aneursysms by encircling the arteries with metal bands, or of many other things.

In reality these are only particular interests of an active surgeon, and one must search elsewhere for the actual work of Halsted.

For those who have visited the Johns Hopkins Hospital, two things stand out: Halsted has created a method in surgery and he has inspired disciples. It is this that gives his clinic such vivid originality, and when one has seen intimately that admirable organization one understands why Baltimore has rapidly become the cradle of contemporary surgery in the United States.

* Prof. Réné Leriche, then of Lyon, now Professor of Surgery in Strasbourg, is well known as one of the most distinguished surgeons in France. His extraordinary studies of the effect of removing the sympathetic nerve supply from the walls of blood vessels have roused great interest. It seems that he exemplifies Halsted's spirit and methods, and, as he himself says, may have been influenced by him. His estimate is perhaps the best and most penetrating appreciation of Halsted as a surgeon that has appeared.

The method of Halsted rests primarily on the biological idea, for those in Baltimore are the surgical inheritors of the spirit of Claude Bernard. It is taught there that surgery should be above all an experimental science. It is on experiment that surgical pathology should lean constantly if it is to progress, and on the other hand experiment should precede and follow every new operative attempt. Surgery is only applied biology. . . . . In Baltimore the fusion of surgery and physiology is intimate. The education of the students is above all biological, and the future surgeons are trained in a laboratory of experimental surgery in contact with living beings, and not in a dissecting room.

Halsted has established the principle that the surgical operation, to attain all that can be expected of it, should respect life, not only of the individual but of the tissues. It must not introduce the least infection and must not traumatise the tissues. On the other hand nothing in the operation can be left to chance. There can be nothing approximate in experimental biology, and every operation should be a physiological experiment in which the desired result should be obtained with mathematical exactness.

He goes on to describe the principal points in such an operation, the use of rubber gloves, the avoidance of catgut, the horror of mass ligatures, the anatomical reconstruction of the separated tissues, the suppression of drainage and the careful dressing with silver foil.

Halsted is the most exquisitely unaffected man one could find. It is because he is so simple and direct, that he has been able to group around him and retain at his side assistants, of whom most have for a long time been masters. His thought was to train them in his own plan of disinterested work—in the cult of physiological surgery, a precise science, not a

lucrative profession, and to aid each one to develope himself in a chosen field, and to incite each to attain superiority by the originality of his researches, while adhering to the rigorous rules of his own conscientious method. This which has produced such men as Finney, Bloodgood, Cushing, Young, to speak only of the elder ones, is the crown of Halsted's work, and illustrates admirably the truth of the phrase "the worth of a professor is measured by the personality of those whom he has trained."

Their letters which began in 1913 continued up to Dr. Halsted's death and one or two might be quoted to show the spirit of their friendship. Prof. and Madame Leriche visited America again in 1921, on the occasion of the meeting of the American Surgical Association in Toronto, and in June spent some days in Baltimore. He writes in December after his return to Lyon:

MON CHER MAÎTRE,

For a long time I have wished to write to you to tell you once more with what pleasure and profit I spent the days with you. All that is already long past, but remains very vivid for me. We have carried away such a pleasant memory of your friendly reception of us and your many attentions. The moments we have passed in Baltimore are the best of all our visit to America, and once more I wish to thank you.

You will never believe me when I tell you of the depth of the impression you have made on me. Since my trip of 1913 you have been for me the master surgeon under whom I should have been happy to work. In conversation with you I have grasped many ideas which had never been clear in my mind before; I have more fully realized the aim that one should follow, and what one should strive to become. Let me tell you

please, that a few days at your side have influenced me more than years with others.

Prof. v. Mikulicz Radecki, Halsted seems to have met first in Vienna when he was there as a student, but apparently they saw little or nothing of each other until much later. In February of 1900 Reinbach, an assistant of Mikulicz, whom he had met in Berne wrote asking for information as to where they could get silver foil and the Halsted artery clamps, and a little later Mikulicz writes inviting Halsted to visit his clinic. That was in 1900 and in 1902 in connection with an interesting case he writes again expressing his interest in what his assistant Dr. Gottstein had to tell him of all that was to be learnt in the Halsted clinic. He says, " I must thank you again for the friendly way in which you received Dr. Gottstein. He wrote me of so many interesting things in your clinic that I am impatient to visit you in Baltimore. But when that may be I can, unfortunately, tell less now than ever. Probably I shall come in the beginning of March and stay until the middle of May." He did come in 1903 and in the course of his visit operated, at Dr. Halsted's invitation, upon a case in which there were gallstones with an infected gallbladder. It seems that he was the only visitor ever so honored by an invitation from Dr. Halsted to operate.

With Prof. Körte in Berlin he had a correspondence over many years, chiefly concerned with their common interest in the surgery of the bile passages.

In a letter written in 1921 Dr. Halsted says, " I am still keenly sensible of your many courtesies to me in Berlin in 1914 and vividly recall the happy dinners at your house in the charming family circle. I am almost afraid to ask if the husbands of your lovely daughters survived the war, fearing that some of them may have succumbed. Prof. Küttner sends me most encouraging news of Germany. He is optimistic as regards the future of your country, and so am I."

Von Eiselsberg he probably met at one of the congresses of the German Surgical Association. In 1906 there came a letter with the photograph of four daughters, and the next is in 1913 with another photograph, this time of seven daughters, which aroused Dr. Halsted's envy. In 1910 the Vienna surgeon visited Dr. Halsted in Baltimore, and later they met in Berlin in 1914.

During the war and the years that followed the suffering of the professional classes in Vienna must have been dreadful, and it is especially about Dr. Halsted's generous aid that the von Eiselsberg family writes. In 1928, long after Dr. Halsted's death Prof. von Eiselsberg writes:

> Before I knew him personally, I estimated him very highly as one of the greatest of scientific surgeons, not only of the United States but of the whole world. All his work was accurate and successful, and his contributions on the thyroid and the radical treatment of cancer of the breast remain as classics. If the name " Johns Hopkins " is familiar to every German surgeon, and even to the general practitioner, it is

because of the work of Halsted. The German surgeons esteemed him very highly, and showed their appreciation by making him an honorary member of the German Society of Surgeons in 1914. He was the first American surgeon to receive this distinction. His name remains immortal, and the school which he founded—to mention only his pupil Cushing—will always exist and flourish. I myself lost a highly esteemed friend in whose company I spent the most pleasant hours during my visit to Baltimore in 1910.

Payr of Leipzig he visited after being in Breslau with Küttner in the summer of 1913. They talked over Dr. Halsted's plan of exchanging assistants, and in February of 1914 Payr wrote to suggest such an exchange, but already it had been completed, Heuer going to Breslau and Landois to Baltimore. After that there are letters from Prof. Payr meditating on the origin and probable consequences of the war;—"Stupidity, malevolence and presumption form the real mainspring of almost every great derangement of a people. The couple of hypnotists who seduce a docile people with promises that can never be fulfilled to deeds whose effects cannot be foretold, sink into oblivion and, unfortunately, never bear the penalty of their stupidity or wickedness. Beheading is no longer modern, but since it involves only a brief unpleasant sensation, is far too slight a punishment for so much human suffering. And now farewell, dear and honored colleague, may you have a merry Christmas and a happy New Year (1916) bringing peace to us all."

Dr. Halsted's answers to all such letters were noncommital, and he quickly turned to his personal friendships or to matters of surgical interest. " The war is so distressing and the news of it so absorbing that I find it hard to concentrate on my work. Whatever the outcome may be, Germany will have taught the world and herself also, a lesson. There will hardly be another great war in our day. Should I survive the war, I would make a great effort to see my German friends again, and I do not altogether despair of being able to read, some day, a paper in the new Langenbeck-Virchow Haus. I have been watching with great interest the current literature on the subject of aneurysms—etc. etc."

" They were happy and instructive days that I spent with you in Leipzig, and I constantly talk of them, and of the delightful little tea party at your house. Will you give my kindest messages to Mrs. Payr, and believe me your devoted friend."

The note book that Dr. Halsted carried with him on his visit to Payr's clinic in 1913 reveals the extent to which his interest was roused by Payr's masterful way in his operations, and by his generally admirable technique. His operating room excited admiration on account of its splendid equipment and lighting, the instruments laid out for one operation numbering more than the whole stock at the Johns Hopkins Hospital. As was his wont, he analyzed every detail in the technique, the character of the instruments, the suture and ligature material, the drainage, and

even the motions of the operator, with an extremely critical attitude, appraising each point that caught his attention quite fairly, as it seems, but not leniently. With some things, such as the application of hydraulic pressure—the injection of fluid into the joint cavity under great pressure—to reduce dislocation, he seemed pleased; of other things he was doubtful or disapproving. "For the amphitheatre clinic, Payr dresses in full operating costume, without his collar, and walks about constantly in his elephantine manner. But gives an admirable clinic."

In this same July, 1913, he visited Enderlen in Würzburg, and although the clinic was not to be compared with that of Payr, he felt a certain sympathy with most of Enderlen's methods, and commented on each item of his technique in turn. He was invited to operate at this clinic, but declined, since the assistants, instruments and methods were so different from his own. A good deal of experimental surgery was attempted there, much of which Dr. Halsted watched, apparently quite sceptical of the plan of the experiment in the cases he saw. For example the attempt to perform a sort of plastic operation on the œsophagus must end in infection of the pleura, and did so in every case. A transplantation of a goitre from one dog to another, with anastomosis of artery and vein, was beautifully done, but the recipient must inevitably have died of tetany since both lobes of its thyroid with parathyroids were removed.

For years afterward, until Dr. Halsted's death, he and Prof. Enderlen exchanged letters, always with enquiries for Dr. Hotz, the first assistant in that clinic who afterward left for Heidelberg.

It was in 1913 too that he visited Prof. Küttner's clinic in Breslau, in June before going to Payr and Enderlen, and there he saw a great many cases, most of them apparently representing extremely advanced conditions of one sort or other. Although as ever critical of methods, and especially where the operation concerned the thyroid gland, he admired Küttner's technique and his operative skill.

It was not only his approval of the general situation and the type of surgical work done there, but also the richness of the surgical material that led him to discuss especially with Küttner his plan of exchanging assistants for a time. Shortly after his return to Baltimore he wrote to Prof. Küttner a long letter which is in part as follows:

"October 29th., 1913.

"—You will perhaps have read that we have made application to the directors of the General Education Board for a million and a half dollars to enable us to inaugurate a new project in the Medical School of the Johns Hopkins University, namely to place the directors of the principal clinical departments on what we term 'academic' or 'full time' basis. Our request has been granted and we shall have funds with which to provide the directors of our surgical

and medical clinics with salaries sufficient for the ' simple life,' and with which to pay salaries to our assistants.

Would you care to have Landois come to us for, say one year, more or less? I would give him opportunities to operate, and facilities for research work; also a small salary sufficient for his travelling and other expenses while here. I am sure that we of the Johns Hopkins School would profit from the experiment which I propose, quite as much or more than Landois, and I hope that the idea may impress you favorably."

In due time this was agreed upon and arranged, and Dr. Landois did arrive in January, 1914, while Heuer went to Breslau a few months later. The experiment was eminently successful on both sides, as the many letters of Landois and Heuer show. Of course upon the outbreak of the war both men hurriedly returned to their own countries, but the friendly relations between the two clinics were not interrupted.

Küttner writes in 1919 to Dr. Halsted:

Today, as the first sign that all bonds with America were not destroyed, I found your beautiful book, and thank you not only for sending it, but for your expression of goodwill.

We have suffered much and are far from the end of our trials. I myself have been in military service since the first day of the mobilisation, generally at the front, and for the last two and a half years in the "Hell of Flanders," twice wounded, once by a splinter from an aviator's bomb, and the other time by the explosion of another large bomb, so close

that I was not only greatly shocked, but suffered a labyrinth hæmorrhage from which I for months labored under the most dreadful Ménière's symptoms. Besides I went through a good deal—dysentery, nephritis, automobile accident, etc., all of course part of the fortune of war.

The only satisfaction was that one could really help in an extraordinary degree, although not much advance in surgery has come out of it.

My wife suffered greatly during the fearful hunger blockade, and the children are only beginning to recover from the severe anæmia following undernourishment, but have luckily escaped tuberculosis. Health conditions have sunken in Germany to a point that seemed impossible—50% of all the policlinic cases are tuberculous, and of the rest, a large proportion have rickets and other bone diseases, such as we never saw in times of peace. Landois proved himself a most successful war surgeon, and has been appointed Professor of Surgery at a large hospital in Berlin.

Heuer was delighted with his reception at the Küttner clinic, and with the kindness of everyone throughout his short stay, and he too expresses admiration for some of their work, but it was seen through his eyes as though it were through Dr. Halsted's, and there seems to have been much to regard critically—many situations where the Halsted ideas could be, and were profitably demonstrated at the specific request of Prof. Küttner. It seems that throughout these visits, whether of Dr. Halsted himself, or of one of his assistants who had thoroughly absorbed his ideas, the things they learned were essentially the original plans that some surgeons might devise for treating some relatively unfamiliar

condition, while the things they looked upon a little askance were the technical methods, and especially whatever depended upon a comprehension of the ability of tissues to withstand and repair injury. Repeatedly they foretold to themselves the failure of some inadequately planted skin graft, or the probable peritonitis in some case in which a portion of the tissue with insufficient nourishment had been dropped back into the abdomen, or tetany where no protective layer of thyroid had been left.

From Lexer there remains only an exchange of letters about the use of silver foil which he had adopted during the war. Dr. H. G. Beyer, an old patient of Dr. Halsted, was working with him during this time in a military hospital in Hamburg, and his letters to Dr. Halsted describe the recognition of the value of silver foil in that hospital very graphically.

Finally there was Prof. Theodore Kocher, whom above all Dr. Halsted admired and thoroughly appreciated. He had paid a visit to Kocher's clinic in 1899, and of this something has already been said. Then, in 1907, Dr. Albert Kocher came to America and took part, at Atlantic City, in the discussion of exophthalmic goitre. It was at that time that the result of the study of Dr. Halsted's operative material from exophthalmic goitre was given, emphasizing the observation of the presence of masses of lymphoid tissue in such thyroids, and when it came to his turn, Dr. Kocher was able to report a correlated discovery of the increase in the number of lymphoid cells in the

blood—an observation which has since aided in the diagnosis. Dr. Halsted discussed these papers and especially referred to the question of postoperative tetany.

Then came a period of several years in which Dr. Halsted made many trips to Europe, almost always seeing something of Prof. Kocher. In 1910 he went only to Paris where he saw Martel and Quenu. In 1911 he attended the 40th Congress of the German Surgical Association and then went on to Berne to visit Kocher. It was on this occasion that he operated in the Kocher clinic. In 1912 he was again in Berne for the Kocher Jubilee, and in 1913, as has just been related, he went to Breslau, Leipzig and Würzburg. Then in 1914 he crossed twice to Europe, once in April for the 43rd Congress of the German Surgical Association in Berlin, where he spent most of the time with Kocher, and again later in the summer, when he found the arrangements for his return very difficult because of the outbreak of the war.

Through all this time and until Prof. Kocher's death in 1917, there was kept up the warmest friendship between the two, and afterward there was a long exchange of letters with his son Dr. Albert Kocher. Dr. Halsted, in thanking Dr. A. C. Klebs for his biographical notice of Kocher, writes in 1918: " I am greatly pleased to have your memorial sketch of Professor Kocher and thank you also for your interesting letter. Kocher's contributions, as well as

his renown, were cumulative up to the time of his death. At seventy-five he was more famous than at sixty, and apparently quite as active. In the spring of 1914 I spent a week with him in Berlin. We were constantly together except at breakfast, being invited to the same houses and when not dining out, taking the evening meal quietly together at the Hotel Adlon, and occasionally going to the theatre afterwards. Your estimate of him seems very just to me and admirably expressed. I found myself almost always in hearty sympathy with his methods and his views. There was no other surgeon with whom I could discuss surgical matters so satisfactorily and in such sustained fashion."

"His Encyclopädie der Gesamten Chirurgie is an example I think of misdirected surplus energy, and indicates also that he was probably not overburdened with surgical problems better worth one's endeavor." He had his faults, no doubt, but he made notable contributions to surgery.

When in 1911 Dr. Halsted went to Berlin for the 40th Congress of the German Surgical Association, he invited Follis to go with him, and Follis, feeling that if he went alone, he might sometimes be felt as a responsibility by "the Professor," persuaded Sowers and Fisher to go too. They all accompanied him to the Kocher clinic, and are visible in the photograph which was made while Dr. Halsted was operating there upon an aneurysm of the abdominal aorta.

After Dr. Halsted's death, Dr. Albert Kocher was good enough to write in a letter his impression of this friendship:

My father liked Halsted very much, and I must say there were very few surgeons with whom he was as intimate. Halsted used to come to Berne for two or three weeks at a time, and attended every day the clinical lectures and operations of my father who took him on all his visits to the patients, and made him examine all the interesting cases. Afterward, he came regularly to lunch in our family house, and there all cases of the morning were discussed. Sometimes Halsted even performed some special operation before the students, and was then assisted by my father and myself. I remember quite well a case of abdominal aneurysm where Halsted put a metal band around the aorta above the sac, also a case of carcinoma of the breast. Besides the clinic he was very often in our family home, as my mother liked him very much. Very often we went together to concerts, and more especially to national festivals, and so on.

Many times the two men met in Berlin for the German Surgical Congress. They both stayed at the Hotel Adlon, and were the whole time together. It was my father, who was of the committee of the German Surgical Association, who proposed Halsted as an honorary Fellow.

The two men were somewhat alike in character. Both not tall or massive as some surgeons are, but fine, delicate, distinguished looking, very modest and yet very noble, very grand, always kind to everyone, more especially to the patients of inferior classes, and yet very energetic and very severe when important things were at hand.

Professor Kocher died in 1917, and Dr. Halsted never saw his Swiss and German friends again, never attended another of the Congresses of the German

Surgical Society, and never read a paper in the new Langenbeck-Virchow Haus for which he had subscribed so generously. Nothing could exceed his regard for the German Surgical Association—he went to infinite pains to secure and maintain a complete set of the Proceedings, and his greatest pride was in his election to the honor of being an "Ehrenmitglied." Once, when commiserating with Kocher on the death of one of the German surgeons, he said, "Professor Sprengel's death was very sad. It is so fortunate that he had the gratification of being elected President of the German Surgical Association."

XIV

IMPRESSIONS OF DR. HALSTED

Everyone who speaks of Dr. Halsted now makes the remark that it would be extremely difficult to give to anyone who did not know him, an adequate impression of the man. Indeed it seems impossible. His was such an elusive personality, so hidden in his habitual reserve and so hedged round with the formality of his manner, that few knew him well. Those who had his friendship often found him more companionable and, for a few, he was delighted to be on terms of complete intimacy and vivacious conversation.

In his later years he was almost bald, and wore a moustache which hung down, and a little tuft of gray hair on his lower lip. It was quite obvious that he was very short-sighted, and his ears projected to such a degree that he had finally become insensitive on the subject, and was known to have joked about it. He was not very tall, and his powerful shoulders were a little stooped. He walked with deliberate, measured tread, and his arms were held bowed out a little, which gave the impression of great muscular strength. He had not in the least a roving glance, but walked along, especially in the hospital corridors, completely inattentive to persons he met, and looked up in surprise if someone spoke to him. Then he

would smile and his face relax in a curious way. At the beginning of a conversation that might ensue he was apparently completely unfamiliar with the situation, and at once was plunged in profound concentration upon the topic and the person who addressed him, oblivious of everything and everyone about him. His formality and extreme politeness hampered the other person a good deal, and the interview finally ended in the same key. With Dr. Welch or Dr. Mall, or others of his intimate circle, it was quite different—one might even detect in him a little dancing step and bright attention, eager to miss nothing of what might be said.

I, who, because of my admiration and affection for the man, write this, was privileged to know him pretty well, after many years of more remote acquaintance, partly through dining alone with him at the Maryland Club, evening after evening in the spring and autumn when Mrs. Halsted had gone to the mountains, and partly through his frequent visits to the Pathological laboratory, where he would sit and discuss his experiments. Then too there were the evenings when he and Dr. Welch and Major Venable and perhaps one or two others talked together, and I was there.

He smoked a great many cigarettes, but never, so far as I can remember, a cigar or a pipe. In his conversation, caution was always evident. He never pretended knowledge of anything—rather it always seemed that one who made any assertion, not directly

Photo by John H. Stocksdale

Dr. Halsted in 1922

supported by trustworthy evidence, was treading on thin ice in his presence, because it was so possible that he was really much better informed. This was part of his habitual reserve, and he even spurred such conversation by asking questions and expressing his interest. What he knew, he knew very precisely and in great detail, and for any new thing that bore on those subjects that he made his own, he had the most eager attention. But he was not a man of very wide reading or very broad interests. He had nothing of Dr. Welch's omnivorous appetite for books on every topic, and seems to have discovered with astonishment that there was something interesting in the popular novels which Col. Garrison lent him. He was not interested in poetry nor in general literature, nor did he care for painting or sculpture, although he was not entirely indifferent to picture galleries and had even picked up two or three old pictures. In the matter of antique furniture and old rugs he was expert, and, as we have said, his house was full of wonderful examples. He occasionally went to symphony concerts, but it does not appear that he knew anything about music or that it made much appeal to him. He really enjoyed the theatre, and, in the earlier years before his marriage, often went with Dr. Welch and had much to tell about the plays he had seen in Vienna and Paris. His conversation touched on many subjects, but he was perhaps most at ease when talking about his own world of surgery or about his various hobbies, or

about people. He was extremely critical of the behaviour of people, although not in the least intolerant or narrow. He merely enjoyed uncovering their motives and their foibles, and hitting them off in phrases as neat as possible.

About worldly affairs, money matters, investments, the stock market and business of all sorts, he was very naïve. Mr. Edwin Baetjer, his lawyer, said that " the gulf which separated his higher intellectual capacities from the ability to understand or deal with the business or ordinary affairs of life, was unfathomable."

Everyone speaks of his wit and the sharp repartee with which he scored so instantaneously in an exchange of pleasantries, and it has already been pointed out that the difficulty of recalling this is almost insuperable. The examples that various people remember have lost all their savour, through separation from the pungency that his manner gave them. He was witty and sarcastic nearly always, that is, with comments that exposed the frailties and self-sufficiency of someone and left him deflated like a punctured tire. But it does not seem that he was humorous, nor that absurd exaggeration or sudden incongruity were natural fun for him.

In the strain and sudden emergencies that so often come in the course of surgical operations, he was perfectly imperturbable, and his sang-froid and real courage cannot be doubted. This extended to his

every-day habit, and he was never disturbed or unduly excited in any contretemps.

In his visits to the Hunterian Laboratory, where he spent so many hours in experimental work, he frequently came over to the half of the building then devoted to experimental pathology, and spent some time in discussing his results and his plans for further steps in solving his problem, or even the question of the problems themselves. One day, impressed by the number of these that crowded into his mind, he said that it would be impossible for one man to pursue them all to the end, and that it might be well to publish them as suggestions, so that others might work to solve them. His notebooks are full of these suggestions, most of which he never had time to follow out. But, really, he was not very imaginative, and his thoughts did not soar very far ahead into the unknown. Instead he had great tenacity, and persisted with experiments intended to clear up the same old problem for ever so long, and even then he was generally left without a very satisfactory solution. This was perhaps because the experiments ended in gross anatomical or physiological results. The outcome of the surgical operations, as such, could be relied upon, but he had to depend upon others for the histological studies or the measurement of blood pressure, for example, above and below the bands he applied to arteries. Chemical or more exacting physical methods did not come within the range of these experiments.

There has always been dispute as to Dr. Halsted's ability as a teacher, and something has been said of this before, but few realize the extraordinary contrast between his attitude as a quiz-master in New York, and his later method in Baltimore. In his New York quiz he appears to have been a master of systematic instruction, absolutely familiar with every detail of the text-book, and rigidly insisting upon accurate knowledge from his students, for theirs was the task of passing examinations. He was regarded as a most able teacher in those days, although sometimes he would spend a great deal of time on some point that held a special interest for him, to the growing impatience of his class. In Baltimore he completely abandoned this method. He never lectured nor held a formal quiz, but in his clinics he would treat of a subject as exemplified by the patient, generally bringing out what he wished to demonstrate by leading one of the students to discuss the case, point by point. This may have seemed to the rest a rather laborious proceeding, unless that particular student chanced to be especially apt, but, as one may gather from one of these clinics reported in the Johns Hopkins Bulletin by Dr. Reid, it was a most instructive process.

He prepared himself most carefully beforehand, and consulted assiduously all the literature that bore on the condition to be brought before the class. It was indeed a most elaborate performance, and such as would prove far more inspiring to an audience of

elder surgeons than to student beginners, because he grew so deeply interested in the several subjects which he preferred to show in his clinics that his discussion tended to be over their heads.

Quite different from this, and immensely effective for those who could come into more intimate contact with him, was his example. For those whom he actually trained, his consuming interest in the problem that held his attention, his enthusiasm, his thoughtfulness and inventiveness and his optimism as shown in his unflagging zeal in tracking down every bit of information that could help to solve the riddle, his tireless energy in trying and trying again ever new experiments or repeating the old, together with his willingness to scan the literature back into the dark ages, formed a stimulus which changed their whole characters and drew them into another kind of life in which these things stood out in a new way as the real motives. Not many men can do that to a young man—it is not a question of instruction but rather of inspiration, and it is not through any plan, but merely that it is granted to that young man to see what forces are at work in his master. Nothing is comparable with this, nor can it be imitated. It is transparently honest, else it is completely impotent, and it is inborn and cannot be cultivated. But there are few such men in the world.

When the " full time " plan was being discussed, he devoted a great deal of thought to it, and even

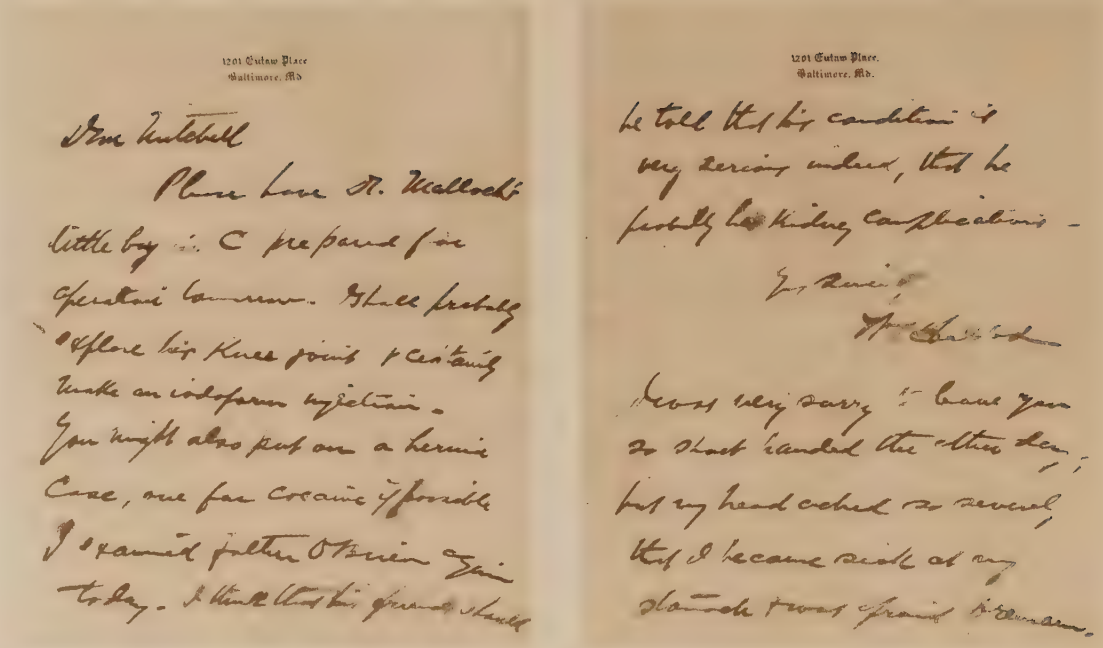
formulated his ideas in writing, although it is not clear that he ever pressed them in any debate. On the whole he regarded the plan with warm favor. For himself he thought it made little difference, financially or otherwise, so that he could consider it impartially. It seemed to reduce itself largely to the question of money, and he realized that there are men who need the stimulus of moneymaking to compel them to work, but that these are not the desirable men. "We wish men," he said, "who have learned to work for work's sake, who find in it and in the search for truth, their greatest reward." "Students ape their teachers. The type of man who stimulates investigation is the best. Some of our greatest men have not stimulated investigation, nor have their clinics yielded men of consequence or fertility." But for himself, he eagerly accepted the new conditions, and the staff was reorganized on the new basis in 1913.

The effect of this new plan, in his case, was remarkable, and evidently clearly realized by him, since he hints at it more definitely in another address. It was, as I see it, to make him feel a new responsibility, not only for the active prosecution of his experimental and other studies, but more especially for the vigorous encouragement of his assistants, in succession, to work with him, intimately associated in the effort to solve the problem. This feeling seems to be the basis of the flare-up in his activity, which became

really intense about this time, although it is true that he had begun to work on the surgery of the thyroid and of blood-vessels before this. The new plan released him from much routine operating, and gave him leisure, and it seems that he was one who worked to much greater advantage when he had leisure. This change was comparable in one sense with that mentioned long before, when he exchanged the strain of excessive work in New York for the leisure of Baltimore in the early days before the hospital opened. It may be objected that he always took leisure during the most active time of work in the hospital, either assigning patients to his staff for operation or leaving town for long vacations, but liberty, after all, is a matter of feeling, and not of the actual moments available, and under the new plan he must have felt more completely justified in devoting himself to the development of the scientific aspects of surgery rather than to the familiar operative routine, when there were so many masters of operative surgery on his staff. At any rate the result was a far more intense study of the problems that confronted him, far greater intimacy with his chosen assistants—a wonderful opportunity for them which not one has failed to grasp—and incidentally an enthusiastic return to the course in experimental surgery, which he now conducted, since Cushing had left. It seems that it was during these years that his assistants really became his disciples and ultimately his fellow workers, in a way hardly enjoyed by those

who came before, and this new attitude of intense interest in the development of the men of his staff became, more and more, his preoccupation, until at the close of his life he looked back upon that long line of able surgeons as his really great contribution—greater than all he had done in his own surgical work. He was very proud of them—they worked intimately with him, and some of them wrote long papers, and sometimes, although he had contributed the ideas and often most of the drudgery of searching the literature, they failed to mention his interest. This may have hurt him, but he never said anything about it. Most of these men have already come to occupy prominent places in American surgery, and it is with them a matter of pride to be members of the Halsted school.

He was most conscientious about answering letters, although so frequently his replies begin in a rather stereotype way—"I am mortified to find that in some way your letter has sifted down to the bottom of a pile and has remained so long unanswered." In the early days he always wrote with a quill pen, with the result shown, but later he used a fountain pen so that his writing became far more legible. At best he was not a gifted letter writer; his letters are very courteous, rather excessively polite, and always a little stilted and formal, without any abandon or play of imagination. It is unfortunate that none of his letters to Mrs. Halsted are preserved. It would have been most interesting to



1201 Eutaw Place
Baltimore, Md

Dear Mitchell

Please have Dr. Mallock's little boy, C prepared for operation tomorrow. Shall probably aspirate his Knee joint & certainly make an iodoform injection. You might also put on a hernia truss, one for cocaine if possible. I examined Father O'Brien again today. I think that his general health

1201 Eutaw Place.
Baltimore, Md.

he told that his condition is very serious indeed, that he probably has kidney complications.

Yours truly,

[illegible]

Dear Mitchell

I was very sorry I could not have you to stay with me the other day, but my head ached so severely that I became sick at my stomach & was afraid I should

A Letter of the Quill Pen Period

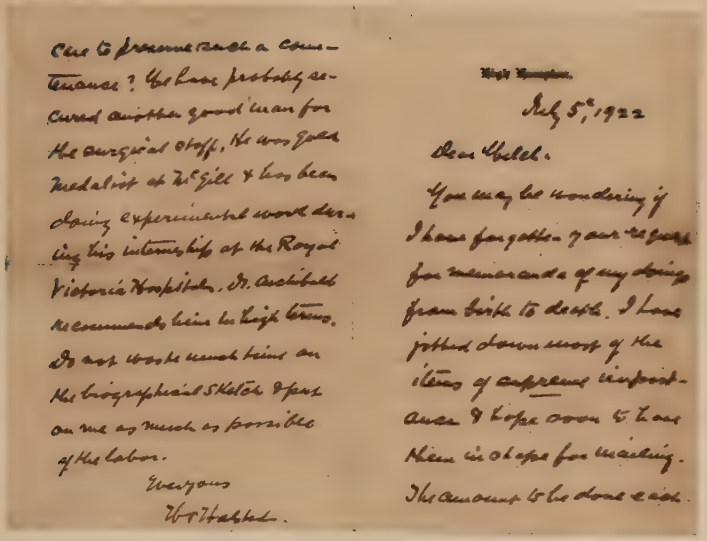
read a letter written when he was quite off his guard. One wonders what sort of letter he wrote in answer to that long one from her which is quoted earlier in this book. Probably "H'm, that must have been interesting." His letters to his sisters and to some of his intimate friends are less guarded, and often attempt witticisms. Some of those to his sisters are in French, but one feels sure that he got someone to write them for him, for he never conquered French, although he was fluent enough in German.

Always, and perhaps especially in his later years, Dr. Halsted was a devotee of the dictionary, and particularly of the Century Dictionary, where he studied also the derivation of words. He was always intrigued by long and unusual words, and in one of his notebooks he has a list of uncommon expressions which are not to be found in most dictionaries: mistone, heuretic, comminate, pernicion and epinicion, heterophemy, nomogenist, and so forth, each with its derivation. He writes, in his "Operative Study of Goitre," "Reverdin anticipated Kocher by about one year, and appellated the train of symptoms 'myxedeme operatoire.'" In another place, "the dead space in the fornix of the axilla is subtended by the tightly drawn tegmen." Other words such as "deligate," "defract" and the "temerous" that so pleased Dr. Councilman, are to be found in his favorite Century Dictionary, and are perhaps only very old forms, not much used nowadays.

But his particular delight was in coining words which he afterward used confidently, indignant when, for example, the Germans failed to understand exactly what he meant by "ultraligation" in describing his operation on the thyroid. Several letters to Kocher, de Quervain and others, complain of the misinterpretation by German surgeons of this word, apparently little realizing that a foreigner might not grasp at once that it meant "ligation of the thyroid artery at a point beyond that at which the branch to the parathyroid glands is given off." Later he seems to have abandoned this technique, ligating the inferior thyroid artery near its origin, and with this change the word should disappear, since it still causes confusion.

He was very precise in all his references to articles and books in medical and surgical literature, and in his quotations, and never ventured the slightest reference without consulting the original. This is only another instance of his honesty, for so many writers, in their haste, perpetuate the errors in references to literature which have been repeated by one author after another.

Everyone who wrote to acknowledge the receipt of reprints which he had sent seems inclined to compliment him on his style. It is true that he bestowed infinite labor on the composition of his papers, and his manuscripts show as many corrections as did those of Robert Louis Stevenson. But it seems to me that the end result was still very labored and difficult to read.



Can I presume such a continuance? We have probably secured another good man for the surgical staff. He was Gold Medalist at McGill & has been doing experimental work during his internship at the Royal Victoria Hospital. Dr. Archibald recommends him in high terms. Do not trouble much time on the biographical sketch & just on me as much as possible of the labor.

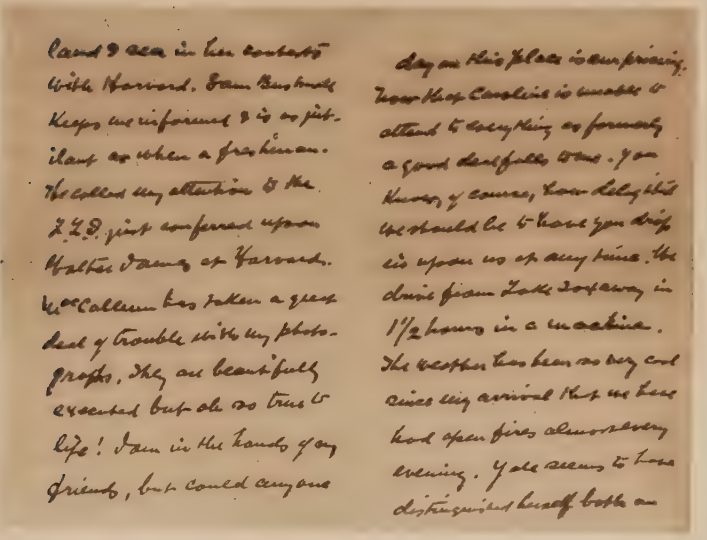
Yours
W. Halsted.

High Hampton.

July 5th, 1922

Dear Chief.

You may be wondering if I have forgotten your request for memoranda of my doings from birth to death. I have jotted down most of the items of supreme importance & hope soon to have them in shape for mailing. The amount to be done each day on this place is surprising. Now that Caroline is unable to attend to everything as formerly a good deal falls to me. You know of course, how likely it is that we should be to have you drop in upon us at any time. The drive from Lake Toxaway is 1½ hours in a machine. The weather has been so very cool since my arrival that we have had open fires almost every evening. Yale seems to have distinguished herself both on



land & sea in her contests with Harvard. Sam Bostock keeps me informed & is as jubilant as when a freshman. He called my attention to the L.L.D. just conferred upon Walter Camp of Harvard. McCallum has taken a great deal of trouble with my photographs. They are beautifully executed but oh so true to life! I am in the hands of my friends, but could any one

A Letter of the Later Period

Dr. Halsted was greatly impressed with the idea of the importance of an adequate library for the Johns Hopkins Medical School, and made great efforts to interest those who might assist in its development. He did not live to see even the beginning of the splendid building which is now completed, nor of the new Department of the History of Medicine with Dr. Welch as Professor, but his extensive collection of books and journals on surgery and the history of medicine have, through his will, come to enrich the library, and it is pleasant to think that his interest has been of influence in the fulfilment of this cherished plan.

He was never inclined to public appearance in any capacity, and genuinely shunned and abhorred the publicity which seems to be the breath of life to many great men nowadays. It was probably for that reason that he was not showered with honorary degrees and titles and corresponding memberships in foreign societies. He was the recipient of some of these honors, but they were comparatively few, and such as must have been conferred in real recognition of his great contributions to the science and art of surgery. For example, he was made Honorary Fellow of the Royal College of Surgeons of England in 1900, and of Edinburgh in 1905. In the same year he received the Honorary Degree of LL. D. from Edinburgh, and a similar degree had been conferred by Yale the year before. In 1904, too, he was given by Columbia the honorary degree, Doctor of Science.

He was pleased to have the LL. D. degree from Yale because it was conferred at the special request of his classmates. Dr. Gilman, then President of the Johns Hopkins University, wrote to him as follows on this occasion:

OVEREDGE, NORTH EAST HARBOR, MAINE,
July 1st, 1904.

MY DEAR HALSTED,

It was delightful to see your name among the honor bearers at Commencement. Such a recognition from one's own college on such an anniversary is priceless. All your colleagues in Baltimore will join, I am sure, with your professional friends, far and wide through the country, and with your personal acquaintances in rejoicing that the honor has fallen upon one who seeks nothing for himself in the way of recognition, but devotes his rare gifts to the relief of suffering and the postponement of the inevitable. I am glad that the character and abilities which we know so well in Johns Hopkins, have once more received conspicuous honor at a distance. With kind regards to Mrs. Halsted,

I am ever sincerely yours,
DANIEL C. GILMAN.

It was a matter of great pride with him to have been elected an honorary member of the German Surgical Association in 1914, and, as it seems, he took pride also in his election to the National Academy of Sciences in 1917, an honor rarely conferred upon practitioners of Medicine. He was honorary member of a few foreign medical and surgical societies and of several in this country. The American Surgical Association he served faithfully, attending their meetings regularly, even in the most

remote places, reading papers and taking part in discussions.*

Dr. Halsted usually left town in May and returned in October, but no one seemed to know where he went, that is it was his invariable custom to spend some part of the time at High Hampton, but whether he went abroad for a time or not was uncertain. There are notes of a trip in 1905, but no trace of one that he

* Titles and Honors

Hon. F. R. C. S., England, 1900, Edinburgh, 1905.
Hon. LL. D., Yale, 1904, Edinburgh, 1905.
Hon. Sc. D., Columbia, 1904.
Foreign corresp. member, Harveian Society (Hon.).
Membre corresp. etranger de la Societe de Chirurgie, Paris, 1909.
Hon. Fellow, American College of Surgeons, 1913.
Ehrenmitglied d. Deutschen Gesellschaft f. Chirurgie, 1914.
Membre titulaire de l'Association francaise de Chirurgie, 1914.
Hon. member, American Society for Experimental Pathology, 1916.
Foreign member, Kungl. Svenska Vetenskapsakademien, Stockholm, 1917.
Hon. member, Societas Medicorum Sverana, Stockholm, 1918.
Membre honoraire etranger, Academie Royale de Medecine de Belgique, 1920.

MEMBERSHIPS

Member, National Academy of Sciences, 1917.
Assoc. Fellow, American Academy of Arts and Sciences.
Fellow, American Surgical Association.
Fellow, American Association for the Advancement of Science.
Member, Society for Experimental Biology and Medicine.
Member, American Association of Pathologists and Bacteriologists.
Member, American Association of Anatomists.
Member, American Medical Association.
Awarded gold medal by the American Dental Association for "original Researches and Discoveries upon which the technique of Local and Neuro-regional Anæsthesia in Oral and Dental Practice now rests." April, 1922.

made in 1900 when he saw Cushing in England. He did not always visit friends when he went abroad, and in later years it was the same. Dr. Osler writes, in 1911, "I have not seen the Professor"; when over here he keeps in seclusion in a very funny way" (Cushing, vol. 2). He was certainly in North Carolina during part of the summer of 1900, but probably spent a short time in England or France in this as in each of the other summers before going to High Hampton. He delighted in brief periods of complete seclusion, and Dr. Welch tells me that he often went to some small place in Brittany, where he could be quite alone. In Paris, he would spend weeks at the Hotel Continental, avoiding all acquaintances, and entering unobtrusively through a side door. When he went over to London, it was only to escape to some hotel in Brighton or Folkestone, where he kept to his room and read, undisturbed by any bank holiday atmosphere. Once he wrote from the Hotel Metropole, Folkestone, to his secretary, Miss Stokes, "This is an ideal spot. En route for Bonn, I have been here for a week, unable to tear myself away. Go to bed at ten punctually and sleep usually until six. My corner room on the fifth floor has an unobstructed view of the ocean in front, and of the downs on the side. At night, I can see vividly the flashlights of two lighthouses on the coast of France, 27 miles away. On a clear day one can see the French coast, and steamers and fishing boats are constantly in sight. I have a soft coal fire constantly, much to the amuse-

ment, I fancy, of the servants, who do not quite approve of the combination of open windows and a fire, when the thermometer registers perhaps 60°, and they are complaining that it is 'ot.''

In 1905 he made a more extended trip visiting Schede in Hamburg, various clinics in Berlin, Terrier in Paris, etc. His notebook gives an exact account of his expenses, most of which seem to be for cabs.

It was on this trip that the wonderful picture of the '' Four Doctors '' was painted by Sargent, and their experiences with that genius are too well told by Cushing to allow of any repetition. The individual heads were photographed separately from this picture which now hangs in the new William H. Welch Medical Library, and such was the photograph which Dr. Halsted sent when anyone succeeded in begging one from him.

It was in this year too that he visited Edinburgh and received two honorary degrees, and there he met a distinguished German surgeon and invited him to dine upon their return to London. Then he was seized with apprehension as to what the surgeon would wear, and such was his nicety in all matters of the sort, that he arranged one dinner at the Carlton and another for the same hour at Simpson's in the Strand. When they met and he found that his friend was attired in a dinner coat with a red and yellow tie and gray check trousers, they went to Simpson's.

XV

FRIENDS IN BALTIMORE

His friendships with men in Baltimore were not many. With Dr. Welch, whom he almost worshiped, he was always on terms of intimacy. They had a whole lifetime of memories in common and in addition to his profound admiration for Dr. Welch's work, and especially for his guiding influence over the whole development of this medical school and of the medical profession in general in America, he was always moved by his feeling of profound gratitude. For it was Dr. Welch who had recognized his genius and ensured his whole lifework by his abiding faith through times when everything seemed lost. It was he who had brought him to Baltimore and watched over him, taking him into his house and into the pathological laboratory, and planning that the stimulus to his experimental work should meet with no check or obstacle. And it was the continuance of this confidence and admiration and friendly support from such a man that so deeply moved him, that throughout his life "his favorite topic was Dr. Welch." Everything that involved sound judgment he referred to Dr. Welch and, in turn, Dr. Welch was as dependent upon him for his wisdom in surgical things.

They enjoyed witty sallies at each other's expense and were constantly exchanging recondite problems such as those involved in constructing a poem in which the letters of one word in different orders supplied the sense in several gaps, or they communicated by notes carefully written in Greek or Chinese. A note from Dr. Welch reads: "Dear Halsted: This is the telegram from President Judson to which I replied that you could see Mr. Parker any time this week. Yours, W. H. Welch." To which Dr. Halsted replied, "Dear Welch: Thank you for President Judson's message. I fail to see how your reply could have been more suitably or less expensively worded—Ever yours, W. S. Halsted."

These two, with Major Venable and Mr. Frank Hambleton ("Uncle Frank"), were old cronies and commonly foregathered at the Maryland Club and sat in the little chess room to talk. Another entertaining companion at these séances was Gordon McCabe, of Richmond, the famous raconteur, who was an old and intimate friend of Major Venable whom he often visited. The conversation on these occasions was often witty and sparkling and sprinkled with good stories.

The Major loved to have Dr. Welch and Dr. Halsted (whom he usually called "Murat") at his house on Calvert Street where, indeed, they dined together very often. Dr. Halsted was almost the only person who could match the Major in quick repartee and they were always crossing foils. The Major said one

night, " Halsted, I passed you on the street today and you wouldn't recognize me! " and Dr. Halsted, quick as a flash, " Why, Major, didn't you see that I was walking with a lady? "

Halsted was greatly attached to Dr. Mall, with whom he had worked in the early days and whose companionship he always enjoyed. " I shall never cease to mourn the death of the incomparable Mall," he writes to Dr. Councilman. " His Sunday morning visits were a delight to me." Long before, in the address in which he had hinted at his estimate of Dr. Welch—apparently an after-dinner speech at the 25th Anniversary of the Medical School to which most of the old students returned, he said, doubtless to the discomfiture of Dr. Mall who was present, " My interest in Dr. Mall is particularly great because many years ago I taught him to think. This was after he had been for five years with His and Ludwig and had come back full of their philosophy. His thoughts were slow and ponderous and he considered himself some metaphysician. But after a year's training in experimental surgery he became relatively alert. Once on opening the abdomen of a dog an enormous Strongylus escaped. Mall cried ' Snake,' and was on a table at the other end of the room in a twinkling. Once we were attacked by a large Newfoundland dog we were anæsthetizing and the rapidity of Mall's escape was marvellous. These reflexes may, of course, have been partly spinal." It was he who took upon himself the great amount of

correspondence involved in having a portrait of Dr. Mall painted in Philadelphia, and in gathering the subscriptions to pay for it.

Dr. Councilman was another of his close friends and, when a trip up the Amazon was planned, Dr. Halsted was solicitous about his safety. Dr. Councilman wrote to tell him of the careful organization of the expedition and said he would bring back something that might grow on the North Carolina farm; "For some reason or other I would always like to be remembered through some growing thing. All that I have said to you pertains also to Welch, for I look upon you two men whom I have known so long as my dearest friends." To which Dr. Halsted replied, "I am greatly relieved—for I confess to having been not a little apprehensive lest the heat and insects of the equator might give a twist to your peerless disposition. You say that inasmuch as a trained nurse is to be in the party you are not looking for trouble. Evidently you are not a clinician."

In another letter, in 1921, Dr. Councilman writes, "I am interested in your writing which is in great and delightful contrast to most medical literature. I find words which to me are new but which I suppose are commonplace in your conversation with the intellectual giants around you. For instance, 'temerous' which is fine, but I think you are the only one who has ever used it. And you have a fine sense of the dramatic which you delightfully express, as in the description of the result of the ligature in an aneurysm."

Possibly those accustomed to group the "Four Doctors" as the founders of the Johns Hopkins Medical School may be surprised that others are mentioned as intimates before Dr. Osler and Dr. Kelly, but it must be plain that it is not to be expected that four men of such individuality should be boon companions. Halsted's relations with Dr. Welch have been mentioned. In Dr. Kelly he found a colleague six years younger than himself, whose interests, although also a surgeon, were directed differently. Dr. Kelly's attitude is, and has been, that of the supremely dexterous, skilful operator, whose aim was perhaps more directly humanitarian than that of the surgeon whose inclination leads him to experimental and pathological studies. Advances in manipulative technique seem to interest him rather than studies of tissue reaction and the relations of resistance to infection, and with the many members of his staff he has made most important contributions. Perhaps this difference in attitude and the fascination of wild life, with snakes and fungi, that appeal to Dr. Kelly are enough to show that they were men of different type. But they were good colleagues and friends and Dr. Halsted constantly sought Dr. Kelly's advice, especially about the radium treatment of cancer and often about historical questions, for Dr. Kelly's library of ancient medicine is extraordinarily rich.

With Dr. Osler, Halsted's relation is difficult to describe even as the extremely diverse characters

of the two are elusive and hard to present. Dr. Osler had a great respect for Dr. Halsted's mastery of surgery and was frequently in the operating room to follow the course of some patient who had first entered the hospital on the medical side. Dr. Halsted felt, as did everyone, the potent charm of the man and admired in him his great knowledge of everything in medicine, and perhaps especially his familiarity with its history. But they were so different that one cannot feel that they could ever have been intimate. Even in his lighter moods Dr. Halsted was very polite and formal, in contrast with Dr. Osler's playfulness, and his studious and retiring habits were very far from Dr. Osler's genial contact with the world at large.

He went sometimes to the Osler house at 1 West Franklin Street and was received by Dr. and Mrs. Osler with delight, but I do not think that Mrs. Halsted went there except with great ceremony.

They met, with others, at many dinners and occasions of various sorts, and they could joke about each other, but it was rather cautious and not at all like the caustic jibes of the companions at the club. In the hospital though, when they were at work, their mutual respect and regard made them a strong combination in building up the medical school.

After Dr. Osler's departure for Oxford their letters were generally about surgical questions that interested Dr. Halsted, and especially about the attitude of English surgeons toward these subjects,

although he usually recounted the news of the hospital when he wrote to Dr. Osler. But he had an ambassador in the Norham Gardens house in the person of Archie Malloch, now Librarian of the New York Academy of Medicine, who as a boy had been his patient and had greatly gained his favor. His letter is as follows:

13 Norham Gardens, Oxford,
4-1-'20.

Dear Dr. Halsted:

You have heard ere this that the dear good man is dead. It came quite suddenly at the end, but better it is that such was the case for, as was observed afterward, he never could have recovered. What an extraordinary privilege it has been to be closely associated with him and what an example his life and work will be for future generations. It was truly a saintly and blessed life which he led and throughout his prolonged illness he was able to look the possibilities straight in the face . . . . Never, I think, has a man been so widely known and so loved throughout the length and breadth of the world. . . . . It was a beautiful, simple service at the Cathedral Christ Church, at 3.15 on Jan. 1st. The church was packed and hosts of friends came down from London. The coffin rested in the Lady Chapel over night, close beside Burton's tomb, and I went up in the motor hearse with it at 7 a. m. on the second. Lady Osler and the others came up by train and there was another very brief service in the Chapel at Golders Green. After the remains were cremated, Bill Francis came back with the ashes. I know what a good, true friend and comrade you have lost. May I extend my sincerest sympathy to you?

There were a good many others who were his friends, but it will be impossible to mention all. Henry James was a classmate of his at Yale and he

was a familiar visitor at the James house in Baltimore before he ever began to study medicine. This friendship continued after he came here to live, and there grew up a great affection for the three sisters, now Mrs. White, Mrs. Johnson and Mrs. McLane, as well as for their brother, Dr. Walter James. I remember one quite delightful afternoon when Dr. Halsted and I drove in a taxicab all the way from town (about 25 miles) to Harewood near Chase, the country place of the Hemsley Johnsons, and there Mrs. Johnson, who is a most talented musician, played Chopin for us through the late afternoon.

Miss Mary Garrett and Miss M. Carey Thomas, then President of Bryn Mawr College, were at first patients of his, but later their relations became those of cordial friendship, as were those of Dr. and Mrs. Harry Thomas.

Of Dr. Matas in New Orleans, it is best to say that he reveals their friendship in his "Appreciation," published as a preface to Dr. Halsted's collected papers and in his remarks at the Halsted Memorial Meeting. Once Dr. Halsted had rescued him from some oppressive ailment, taken him into his own house, performed the operation there that brought him recovery, and watched over him until he was well, and this was one source of the reverent devotion that Dr. Matas felt for this friend whom he admired and loved through all the years that remained. His letters are many and most vivid, and to one of them reference is made in another place in connection with

the dentists' honoring of Dr. Halsted for his early discoveries in conduction anæsthesia.

With Dr. W. W. Keen he kept up for a long time an animated correspondence, mostly about the recommendation of men for membership in Associations, or for prizes, but there was really a warm friendship between the two men. At Dr. Keen's request Dr. Halsted did write an estimate of the value of the Carrel-Dakin irrigation, about the effects of which, especially in infected wounds of long standing, he was most enthusiastic. He insisted that regardless of the possibilities of aseptic surgery in primary operations and its essential importance as far as the operator is concerned in all operative procedures, the use of antiseptics must naturally continue, particularly in situations where an infection in the tissues has been long established.

Although he seemed so much of a recluse, he did manage to see a good many people, and always he was looked upon with a mixture of affection and admiration which amounted to reverence, although it was always tempered with humor and a momentary expectation of some surprising turn of thought or some witty remark. He delighted in the Howlands whom he often visited in their house in Oak Place. During the war no one was so violent in his anti-German sentiments as Dr. Howland and they were annoyed and outraged to receive regularly, through the gloomiest times, the Fliegende Blätter, apparently direct from Germany. It was long before they

discovered that this was Dr. Halsted's practical joke. He did not often perpetrate practical jokes, but once on returning from Germany he appeared at a medical dinner at the Maryland Club as the personal representative of the Kaiser, to confer the order of the Red Eagle of the Second Class on one of his colleagues. He drew out the insignia from the morocco case, with its broad ribbon, so thick that it would scarcely bend, and with an appropriate and dignified speech presented it. The recipient was overcome and made an extremely grateful and formal response, couched in terms which might be sent back to the Allhighest—but in the course of the dinner it leaked out that Dr. Halsted had bought this order in a pawnshop in Berlin.

David Paton was an intimate friend and with the Stewart Patons he carried on a bantering friendship. Mrs. Stewart Paton, of course, is a distant cousin but in spite of her youth he always addressed her as his aunt. Among them, they succeeded in a conspiracy to produce an equestrian statue of Dr. Welch. It was actually made by Miss Anna Hyatt from a photograph, surreptitiously taken by Simon Flexner, of Dr. Welch riding an absentminded looking horse in China, on an excursion to the Ming tombs. He is smoking a long cigar—the reins have dropped from his hand and the horse is looking around at him. It is an extraordinary likeness of Dr. Welch and they were delighted—especially when

the statue cast in bronze was presented to Dr. Halsted and he made a speech of acceptance.

"I hardly trust myself to speak—my voice is choked with pharyngeal tears. It seems a desecration to try to discover what this beautiful work of art represents, what story it unfolds, what lesson it conveys. It must conceal a deep significance. Let us contemplate it carefully and try to divine the message which it bears.

"That it is a horse carrying a rider seems indisputable, at least at first glance. But is it really a horse? The expression of the face is almost human but the other features—head, mane, tail and legs—are not. The face is pleading and reproachful, not resentful. It expresses astonishment, as well as distress. It seems to say 'I have on my back a superior being who is lost in thought and hence his sense of proportion and compassion distorted or obliterated.' The tail expresses precisely the same sentiments. The legs not being endowed with the intelligence of the tail indicate merely weariness. In our sympathy we ask ourselves 'is all this suffering worthwhile, does it serve a good purpose? What is the load the patient creature bears?' Here the genius of the artist manifests itself with crystal clearness and sublimity. The beast is supporting a superior being entrusted with a lofty mission. Is it Perseus on Pegasus flying to the relief of Andromeda? Is it Jeanne d'Arc—but she would hardly be carrying a cigar. Might it be Sancho Panza. I verily believe it is. If so, this is a

most touching episode and my voice again begins to thicken with emotion. Sancho Panza presented to the chivalrous but deluded Don Quixote by his charming Aunt."

Dr. Halsted for years kept up a correspondence with Col. Fielding Garrison, of the Library of the Surgeon General's Office, in the beginning generally about surgical literature or the portrait of some surgeon, such as Luigi Porta, later about the publication of the writings of Dr. Welch, and finally about all sorts of things. In this case it was Dr. Halsted who was forever indebted to Col. Garrison for every sort of aid in the laborious search for obscure books and papers which were to be found only in the incomparable Library of the Surgeon General's Office. Nothing seems to have been too troublesome for Col. Garrison who advised on purchases of foreign books, translated Italian papers, searched Europe for old portraits, and edited and criticized various efforts of people in whom Dr. Halsted was interested. They actually met only a few times, when Dr. Halsted visited the Library or Col. Garrison came to tea at his house in Baltimore, but after a time Dr. Halsted found himself reading lighter literature, such as Willa Cather's stories, and even discussing unfamiliar music at the suggestion of Col. Garrison. In 1922 one of his letters begins: "Dear Garrison: The books arrived last evening and your welcome letter of warning 24 hours earlier. Mrs. Halsted and I are sadly in need of amusing reading, particularly

just now, for she is not well, and being a prodigious consumer of trash, as well as good literature, I find it quite difficult to keep her supplied.'' His last letter to Col. Garrison was written (May, 1922) with pencil, '' I am on my back, horizontalized by an attack of choledochitis.'' This was to wish him a happy and fruitful time in Manila.

Quite different was his feeling about Lange, the German surgeon who lived long in New York and to whom he looked up as to a teacher. Lange, who had been Esmarch's assistant, was early in the field of rational surgery and was evidently a good surgeon. Indeed, Dr. Halsted actually appealed to him to come to Baltimore once when he himself required some trifling surgical operation, and this was carried out in the house on Eutaw Place with Dr. Finney assisting. It was Lange who presented the first dachshunds to Dr. Halsted. After many years of activity in this country, he returned to his old home in East Prussia and suffered greatly during and after the war, especially since his property in the reapportionment of territory came under the Polish Government. Several letters revealing extreme poverty and misery came from him in his later years and Dr. Halsted did what he could to afford him relief.

The women who were his friends seemed always to arrive at the same attitude toward him. Perhaps because of the acuteness of their perceptions they realized exactly what he was—possibly by a sort of natural selection only those who held this attitude

tended to become his friends—or by another sort of selection they only, were allowed to become his friends. In this case they saw a man evidently of great intellectual power, courtly and polite in the extreme, always a little distant and not to be treated with familiarity, a man not accustomed to triumphant success with women, but on the contrary shy and, with them, a little ill at ease. They realized his essential importance in the world and admired and respected him, but they had no trace of the intimidation that most men felt to a greater or less degree because they knew nothing of his weapons, so effective in his look, tone and a turn of speech. Rather they reached an affection for him which seems to have been based partly upon his apparent shyness, partly upon his uniform appreciation of their friendliness, but mainly upon the pleasure they found in his conversation.

His sisters, Mrs. Terry and Mrs. Vander Poel, had the most profound admiration for him beyond the affection which they lavished on him. They realized that he stood apart from all the people about them, and felt an immense pride in his career and achievements. They leaned on him in times of illness and he never failed them. All their children looked up to him with the same love and wonder.

One of the most beautiful friendships, which had just the same admixture of deep respect and admiration with a half protective affection, was that of Mrs. Hugh Young. While almost all the others

sought his assistance or advice, she was one of the very few who were near enough to be kind to him, and his brief notes to her are constantly full of the pleasure she had given by sending great armfuls of flowers or some other graceful offering. From the distance of their beautiful home she seemed to hover over him and Mrs. Halsted, always thoughtful of their welfare, and her devotion to him was most cordially returned. He was spared the pain of knowing of her long and fatal illness.

XVI

SURGERY OF ARTERIES AND ANEURYSMS

As long ago as 1892 Dr. Halsted entered upon what he, long afterward, spoke of as a " vibrant domain of surgery," when he operated on an elderly negro who had an aneurysm of the subclavian artery, and permanently cured him, actually tying off this great artery and removing the aneurysm. It was then the only successful ligation of the first part of either subclavian artery and the first one of complete extirpation of such an aneurysm. As he says in a later paper, " What surgeon called upon to treat a huge aneurysm of the neck or groin has not experienced the disturbing sensations which only such tumors can arouse? When confronted with an inoperable malignant growth one feels the great pity of it, but not as in the case of an aneurysm, a peremptory challenge to face the exigency and cope promptly with the situation. In ligating the first portion of the left subclavian within the chest the operator is impressed by the miraculous effect of the ligation of the artery upon the great pulsating tumor which, with each beat of the heart, jars the whole frame of the sufferer. The moment of tying the ligature is indeed a dramatic one. The monstrous

booming tumor is stilled by a tiny thread, the tempest silenced by the magic wand.''

This dramatic appeal must have haunted his mind, but it was not until about 1904 that he began to make experimental studies to determine the best methods of dealing with such large arteries. He tried various sorts of ligatures and finally invented a little machine which would curl a band of metal around an artery, constricting it to any required degree. With this he experimented upon the larger arteries of dogs, finding that he could indeed narrow the artery or completely occlude it, but, although the metal band appeared to serve satisfactorily for a long time, he usually found after many months that the crumpled wall of the artery was greatly thinned inside it, but could still be spread out to its original size. In other cases, when the band was perhaps a little tighter, the wall might be found entirely necrotic or dead within the band and then it was common to find that the edge of the band nearer the heart had cut through with fatal hæmorrhage. He never found the innermost or lining layers of the artery fused, nor did he find a thrombus or clot formed there, but sometimes when the wall became necrotic there was produced a vascular core of connective tissue that filled and obstructed the narrow remaining lumen.

This invention continued to appeal to him in spite of the risks attending its use and he employed it in many operations on human beings, generally with success, although in the case in which it was applied

in Kocher's clinic, in 1911, above an aneurysm of the aorta, the band finally cut through the aorta with fatal hæmorrhage. In later experiments he found, as he thought, that if partial occlusion only were produced by rolling the band more loosely, the direct circulation is not stopped, but such an artery as the common iliac partially occluded by a metal band will ultimately become completely obstructed. He goes on, in this paper on the ligation of the common iliac artery, to say, " But I have been constantly apprehensive lest in the case of the aorta the wall might ultimately give way, atrophying slowly but surely under the pressure exerted by the constricting metal. As our laboratory for experimental surgery is closed during the summer, it has not been feasible for me to observe the ultimate effect of a partially occluding band upon the aorta of a dog for a period longer than seven and a half months." He seems to have realized that occlusion of an artery in continuity is more likely to end in hæmorrhage than if the artery is actually cut through after ligation, and always to have had some fear of this in his partial occlusions, but it is only since his death that this has been greatly emphasized, especially by Holman.

But partial occlusion gave him the opportunity to speculate upon some curious phenomena, such as the dilatation of an artery beyond the point of constriction. When a subclavian artery, for example, is hung up over an abnormal extra, or cervical, rib it becomes dilated beyond that point at which it is

compressed. Dr. Halsted reflected on this for years and in experiments with narrowing of vessels by applying metal bands found that he could reproduce it, but he never came to any satisfactory explanation. The best he could offer was: "The abnormal whirlpool-like play of the blood in the relatively dead pocket just below the site of the constriction and the lowered pulse pressure may be the chief factors concerned in the production of the dilatations." This was what he communicated to the National Academy of Sciences in 1918.*

In the paper already mentioned on the ligation of the common iliac artery he recounts the history of a case in which he attained a complete and permanent cure of an iliac aneurysm by putting a tight metallic band on the common iliac artery. He quotes all the previous cases in the literature. In this case the sac faded away and disappeared, but he felt that wherever it is feasible the sac should be extirpated. It is not a very conclusive paper—not comparable with a later paper on the subclavian artery—but he ends up, "One of the chief fascinations of surgery is the management of wounded vessels, the avoidance of hæmorrhage. The only weapon with which the unconscious patient can immediately retaliate upon the incompetent surgeon is hæmorrhage. If he bleeds to

* Dr. Halsted's papers presented to the National Academy made a most favorable impression upon the members as revealing the genuinely scientific interests and experimental methods of a surgeon keenly devoted to the elucidation of his problems in the spirit of biological research.

death it may be presumed that the surgeon is to blame, whereas if he dies of infection or shock or from an unphysiological operative performance, the surgeon's incompetence may not be so evident."

Another case of the same kind was treated by narrowing the external iliac with a metal band and after this had stimulated collateral circulation to form, the aneurysm was excised. " I have cited this case at such length because it seems to me to demonstrate quite convincingly that the employment of the metal band was not without avail. One might well perhaps allow a longer time for the establishment of the collateral circulation but in this instance it was not possible to do so as I was to sail for Europe two days after the second operation."

But it was clear that the mysteries of the circulation in relation to complete and partial occlusions, collateral circulation and venous return, were only beginning to present themselves. Especially when there was an artificial communication between a large artery and the neighboring vein, things became complicated. Such arteriovenous fistulæ interested Dr. Halsted extremely although he really never published more than a very short paper about them himself, but only through his assistants, Callander and later Rienhoff and Holman.

In 1914 he presented his results on the partial closure of large arteries before the German Surgical Association which he approached so reverently and which, at that meeting, made him an honorary

member. His conclusions were that partial closure of the aorta could be produced in the human being without danger by the application of the metal band and that when collateral circulation had thus been established the aorta might be tied completely. He did, however, mention the fact that the diseased artery wall, such as is usually found in association with an aneurysm, might, as in the Kocher case, be unexpectedly cut through by the band. Certain aneurysms can be cured by incomplete closure of the artery, but in his experience the aorta must be excepted from the arteries upon which a metal band can be permanently applied without danger of hæmorrhage.

His study of the "Ligations of the Left Subclavian Artery in its First Portion" seems to me the best of all his papers. It is, as in the case of several of his long papers (Operative Story of Goitre, Ligation of Common Iliac Artery, etc.), largely a review of the history of the subject with an analysis and criticism of what was done in each of the reported cases, and in this one he goes back to Antyllus and gives a pleasing translation from this old surgeon, made for him from the Greek by Mr. Livingstone of Corpus Christi. In this paper he recounts the entirely successful operation on the negro, Alexander Miller, so well known to all of us, in whom he ligated the left common carotid and subclavian arteries and then after two years excised the huge aneurysm. It is in this paper too that he dis-

cusses the dramatic case of Oppel and Korotkow, two Russian surgeons, who operated three times in one day on an arteriovenous aneurysm in the axilla. At the risk of overloading this sketch with what must seem dry technical details, this story must be told because in itself it is so surprising and because the principle involved is only now being widely recognized. It was this. A rifle ball had cut both artery and vein and a sac had formed between them which allowed blood to run directly from the large artery into the large vein. Oppel tied the artery above this sac and also one of the large veins, and the hand at once became cold and white, no blood reaching it at all. He operated again and tied the main vein above the sac—still no improvement. Then he operated a third time and tied the artery below the sac and removed the sac, tying all its connections with veins. Immediately the hand became warm and red and the man recovered complete health. The point is that when in the first operation the main artery was tied the circulation in the hand depended on collateral or sidetrack arteries, but these connecting with the lower part of the main artery found it easier to pour their blood back into the sac, and directly into large veins, than to send it down into the hand. The tying of several veins was of some use, but that path was still easier than the one through the hand and it was only when the open arterial connection with the veins was tied that the circulation was forced through the hand. It brings out the point that a certain balance

is required for an adequate circulation so that if a large artery, such as the femoral, be tied the danger of death of the foot will probably be decreased if the corresponding iliac vein be also tied. The whole circulation of the extremity is on a lower plane but at least it is kept at a more adequate tension, whereas if the venous escape is extremely easy and the arterial inflow reduced to that from collateral vessels, the blood pressure in the tissues may become insufficient to keep them properly nourished.

All this was in 1920, and there remained little time for Dr. Halsted to make use of this surprising principle but his student, Holman, has kept an interest in these questions and has written most convincingly. He concludes that ligation of a large arterial trunk should be accompanied by occlusion of the accompanying vein—large arteries should be ligated with broad tape and cut through between ligatures—not left in continuity. These ligatures must occlude but not crush the artery. Partially occluding or crushing ligatures applied to large vessels are dangerous because of rupture and fatal hæmorrhage. Proximal ligation of the artery for an arteriovenous fistula is contraindicated, not only because of danger of distant gangrene but because it is quite futile in curing the fistula. Following operations upon large vessels the wound, as Dr. Halsted insisted, should be completely closed without drainage.

All this is quoted merely to show how extremely complicated the question of hydrodynamics becomes

in aneurysms and arteriovenous fistulæ, so that the mere planning of operations, regardless of their technical execution, becomes a matter for long and careful consideration.

That Dr. Halsted had such a series of successes in operating on aneurysms of every sort is good evidence of his thoughtful planning, his sang-froid and courage and incidentally of his extremely perfect aseptic technique. It seems surprising to one accustomed to the appearance of syphilitic aorta and sclerotic arteries at autopsy that the surgeon felt no especial apprehension about operating in such cases, as compared with cases in which normal arteries had been injured by trauma.

On the whole, in looking back it seems that Dr. Halsted was very successful through the qualities mentioned, in operating on many cases of aneurysm in all situations; he invented and upheld the constriction and partial occlusion of arteries by the metal ring although he realized that it was dangerous when applied to the aorta, and in a letter in 1921 to Dr. G. T. Vaughan he said, " Metal bands may be applied, as you know, with impunity to the aorta of dogs, but I have the feeling that the spiral tape may be safer for the diseased human artery. The capsule formed about the tape is denser than about the metal and hence better, but the chief argument for the tape would seem to be that the edges of the metal may cut through too quickly." He found that such partial occlusion might cure some aneurysms of distal

arteries although he recognized the fact that it would be more satisfactory to excise them. He observed the dilatation of an artery distal to a partial occlusion but could never explain it satisfactorily. He also observed the dilatation of the artery proximal to an arteriovenous fistula and indeed he induced Mont Reid to describe dilatation of arteries and veins and of the heart in such cases. He was greatly interested in the observations which showed the necessity of maintaining a balance in the peripheral circulation when a large artery was obstructed but he had no time to experiment with this, and finally I think he realized that he was just at the threshold of the surgery of the arteries and veins.

XVII

THE LAST YEARS: FINAL ILLNESS AND DEATH

About this time Dr. Halsted became interested in the swelling of the arm so often observed after an extensive operation for the removal of a cancer of the breast, and found that after a modification of this operation the swelling did not occur. This was because the new operation left no dead space in the axilla, for he was able to show that the œdema or swelling was accompanied by general symptoms of illness with fever and that it was undoubtedly due to a bacterial infection. He called it elephantiasis chirurgica and discussed other forms of elephantiasis, such as those occurring in the tropics, and concluded that in all there was the prominent element of infection. In order to prove this he had Reichert, with Reid and Bidgood, perform experiments to determine how far the obstruction of lymphatics, veins and arteries might be carried if absolute asepsis were maintained, without producing gangrene or lasting œdema of the limb. The most surprising things were learned from these experiments and the details must be read in Reichert's papers, but here it may at least be said that the leg of an animal may be cut off except for the main artery and vein, and after tying all bleeding points,

stitched back again in position—then after a few days the main artery and vein are tied so that there remains nothing whatever of the old connection between the arteries, veins and lymphatics of the body and the extremity, and only the new collateral channels where the tissues are sewed together, and still there is no gangrene and no swelling. This seemed quite sufficient to prove that the swelling of the arm, a year or more after the operation for the removal of the cancer of the breast, cannot be confidently ascribed to a mechanical obstruction alone. Reichert has gone on with the study of such circulatory conditions with extraordinary results.

Dr. Halsted presented the last of these papers at the National Academy of Sciences in April of 1922.

Through these later years Dr. Halsted was never in very robust health. He made a brave effort to attend meetings of the American Surgical Association and acted as president of the Maryland Medico-Chirurgical Faculty in 1918, and had Dr. Keen and Dr. Victor Vaughan to give addresses at those meetings. He presented papers at the National Academy of Sciences in 1918, both at the spring meeting in Washington and at the autumn meeting in Baltimore, and later at the spring meeting in 1922. But he was not very well, and in February and March of 1919 he was confined to the house for two months with a severe bronchitis. He went, however, to High

Hampton and enjoyed most of the summer there although he spoke in his letters of being tired. There is no clear indication from his letters of the onset of symptoms of gallstone colic, but toward the end of August he telegraphed that he was returning to Baltimore and almost at once after his arrival he underwent an operation by Dr. Follis for the removal of gallstones. The gallbladder was removed and the common duct cleared out and drained. Reid, in describing the method which Dr. Halsted had devised of draining the common duct through the cystic duct, mentions cases in which this was remarkably effective. He goes on, " It was not until Dr. Halsted had been operated upon for stones in the common duct and experienced the distressing consequences of the loss of all the bile for a period of three weeks that he insisted upon the closure of the incision into the common duct and drainage of this duct by way of the cystic whenever possible. He had indeed requested that this procedure be adopted in his case, but the cystic duct entered the common duct from behind and the common duct was drained in the way practised by surgeons the world over. On the second day the bile began to leak about the tube and afterward for three weeks poured in great quantity from the sinus. Food was positively repulsive and the sense of taste was so far lost that frequently he seemed unable to distinguish one thing from another except by sight. By the fourteenth day emaciation and weakness were so marked that grave concern

for his life was felt. In three weeks he lost thirty pounds in weight.'' But Reid and Bloomfield stood over him and made him eat, and after awhile the sinus closed and bile went on its normal course. Then he suddenly acquired a ravenous appetite and awoke from his despondent stuporous state and began to write to his friends about the delicious things he had to eat. His recovery was rapid and satisfactory after that and by January he felt very well.

That summer, the summer of 1920, he seems to have enjoyed greatly, but in December he complained of hyperacidity and pains which suggested pancreatitis to him, no doubt some slight symptoms of further gallduct inflammation.

His work went on and it was in 1920 that the large monograph on the Operative Story of Goitre appeared, although most of the work had been completed long before. In 1921 appeared his remarkable monograph on Ligation of the Subclavian Artery and the briefer one on Elephantiasis Chirurgica.

He turned his attention once more to questions of suture of the intestine, always eager to devise a perfectly clean method of uniting intestine, end to end, and finding the most difficult problem in the large intestine. He had written several papers on this subject, in 1897, in 1910 and 1912, and in each series of experiments he tried some new plan always in the effort to complete the union of two portions of the intestine, end to end, without the slightest soiling of the outer, or peritoneal surface with intes-

tinal contents. There was always in the later experiments the difficulty that there remained a diaphragm or cross partition after the two ends were united. Several attempts were made to obviate this by the use of soluble cylinders or cones over which the end of the intestine was inverted, but these were not satisfactory. Finally he devised the plan of sewing together the two closed ends—after the removal of the intervening part of the intestine—as though that part had been the site of a cancer—and then pushing a knife, covered by a guard, on a long flexible holder upward through the intestine to the place where the double partition, produced in closing the two ends and uniting them, still remained. By pushing back the guard the knife could be forced through this partition.

It seems still a clumsy method although it has been used with success, once or twice, in human beings when a cancer had to be removed from very low down in the large intestine, and it is probably in such cases where the operation is difficult because of the position of the tumor low in the pelvis that it may be most useful. Dr. Halsted himself never had an opportunity to perform this operation except in experiment on animals.

Through 1921 he seems to have been pretty well until October, when he had a rather severe enterocolitis and a number of furuncles which gave him a great deal of discomfort and pain. In November there were once more symptoms of acute cholangitis

and such attacks seem to have come on quite frequently, but he was fairly well all winter and went to the meeting of the National Academy of Sciences in Washington, in April, and to that of the American Surgical Association, also in Washington, in May, and took part in the programme and in discussion in both.

In April of 1922 there was held a great banquet in honor of Dr. Halsted, organized by the Maryland State Dental Association on the occasion of the presentation of a gold medal by the National Dental Association "in recognition of his original researches and discoveries upon which the technique of local and neuroregional anæsthesia in oral and dental practice now rests." At this dinner about three hundred guests were present and addresses were made by President Goodnow, Dr. Friesell, Dr. Welch, Dr. Finney, Dr. Smith, Dr. Barker and Dr. King, while Dr. C. Edmund Kells was toastmaster. Dr. Halsted was quite overcome by the general expressions of admiration and affection for him, and the enthusiastic recognition of the very great value of his pioneer work in investigating and making available local anæsthesia, which has spared humanity so much suffering and in some cases made possible operations on persons to whom general anæsthesia might have proven fatal. The study of the literature and the records of the early work which showed that it was to Dr. Halsted that the world owes the discovery of the possibility of con-

duction anæsthesia or nerve blocking was due to the energy and devotion of Dr. R. Matas. The circumstances are given in detail together with Dr. Halsted's letter to Dr. Kells in his collected surgical papers. In one letter to Dr. Matas he says, " You are indeed a sturdy friend. I wrote very little on the subject of my cocaine experiments which for a year were carried on vigorously. Then my health gave way and for more than a year I was incapacitated, and thereafter for two years worked in the Pathological Laboratory of Dr. Welch at the Johns Hopkins. Thus my misfortune has its bright as well as its gloomy side." In another letter of April 3, 1922, after the dinner, he writes, " My dear, dear Friend: How can I ever express my gratitude to you for this act of unparalleled kindness, an act which has covered two years. The celebration, as Dr. Kells will tell you, was a remarkable success. I am so thankful to have lived to take part in it. Not a wink of sleep did I get during the night of Saturday—I was too exhilarated for repose. Once before in my life I was kept awake by great happiness—this was the night that I passed successfully the examination for Bellevue Hospital in 1876. Then it was in contemplation of the future, now in reflection upon the good fortune which led to our friendship."

In June he was walking one morning quite near the Pathological Laboratory, and although his almost violent disinclination to be photographed was well known, we ventured to persuade him to come into the

laboratory and let the photographer, Mr. Stocksdale, have a chance to make a picture of him. In a letter to the editor of his collected papers a few days later he said, " The day before yesterday the photographer of the Pathological Laboratory made many attempts to get a good photograph and I shall know the result today. I am not well impressed with my features in these days, as you may know. I am becoming old and shrivelling up. The best of my photographs was taken just as I had finished my interneship at Bellevue when I was vigorous and confident." Later, from High Hampton, he wrote to me, " Mrs. Halsted and I have scrutinized the portraits several times and conclude with you and the others that the one with the hand to the mouth is perhaps the best for the purpose (frontispiece of his collected papers). But Mrs. Halsted rather prefers the little one in which I am looking down reading your letter. She says they all look as I do when one of my choledochus attacks is upon me and this happened to be about the case—the attack was just wearing off, as I think I mentioned to you. If it would do to postpone the making of the photogravure until the autumn I might be feeling better. I generally brace up a little during the summer. But I fancy there will not be a great improvement so please proceed as you think best."

The summer seems to have passed without any severe attack of his enemy, but in August he telegraphed that he was coming to Baltimore, and asked that Doctors Heuer and Reid be hurriedly summoned

Photo by John H. Stocksdale

Dr. Halsted in 1922

to operate on him as he felt that the attack demanded operation. They came at once and did operate. They watched over him night and day, as everyone else in the hospital would have gladly watched, had their devotion been of any use. But he sank gradually and continuously, and although he was given transfusions of the blood of Reid and others, he died during the morning of September 7, 1922. It was found that the operation in itself had been perfectly performed in that the suture of the incision in the common duct through which the stone had been removed was healing smoothly. The field of operation remained open into a cavity lined with granulation tissue, and drainage of bile to relieve tension was obtained, as he had advised, through the remnant of the cystic duct. There was no general peritonitis. But pneumonia and pleurisy had intervened, and the whole of the upper lobe of the right lung was consolidated, with almost a pint of turbid fluid in the pleural cavity. There was advanced arteriosclerosis, especially of the coronary arteries of the heart.

The funeral was at 4 p. m. on Saturday, September 9, at his house, followed by cremation at Loudon Park Cemetery.

There was an editorial in the Baltimore Sun of September 8, by Mr. Frank Kent who admired Dr. Halsted, and it may be quoted in part.

Because Dr. William S. Halsted lived the world is a better, a safer, a happier place in which to be. In his death not only Baltimore, but civilization as a whole, has sustained a heavy loss. He was one of the few men who really count. Quiet,

simple, unostentatious except in the medical world where he towered, a great and dominating figure, the full scope of his genius and the tremendous extent and value of his services to mankind were neither generally known nor generally appreciated.

To the Johns Hopkins Hospital, the institution to whose reputation and upbuilding he had so enormously contributed, his death is a staggering blow. Along with Osler and Welch he laid the foundations upon which the Hopkins so solidly rests today.

Although Mrs. Halsted was with him throughout his last illness and until he died, she was exhausted and could not go, a week later, to Brooklyn where, on September 17, 1922, his ashes were buried in Greenwood Cemetery.

Dr. Welch wrote to her afterward, on October 13,

DEAR MRS. HALSTED:

I have been considering the inscription for Dr. Halsted's gravestone at Greenwood Cemetery. I visited Greenmount Cemetery in Baltimore to see what is customary and have consulted with several friends who would be informed. I find that in recent years it is customary even for those who are distinguished, or have held prominent positions, to put nothing on the gravestone except the name and dates of birth and death. I think, however, that the position held by Dr. Halsted in the Johns Hopkins should be added, even if the custom seems to be to omit titles, degrees and positions held.

I have, therefore, written Mrs. Terry suggesting the following:

William Stewart Halsted, M. D.

September 23, 1852–September 7, 1922

Professor of Surgery in the Johns Hopkins University.

I said to Mrs. Terry that I should submit this to you but that I thought you would agree and would like it to be simple.

May I assume that the form of inscription suggested meets your approval, or have you any suggestions to make? I am not much in favor of sentiments or quotations to be placed on tombstones, but I do not know how you may feel about this. Of course it would be different for a memorial tablet which I hope we may sometime have in the hospital.

I attended the interment of the ashes in the family lot in Greenwood. Only the brother and sisters with their families were present besides myself. A son-in-law of Mrs. Terry, who is a clergyman, made a prayer at the grave but there were no other exercises.

The lot is a large one and beautifully situated overlooking the bay. There is a central shaft but the vaults are not visible, being deep under the ground. Dr. Halsted's is the only grave and I understand the gravestone will be flat over it.

I hope that you know how completely I reciprocated Dr. Halsted's feelings of affection. I admired him above all my colleagues. There is no one who can fill his place as he did. The memory of his wonderful character and life and devotion must be your most precious possession.

Mrs. Halsted was desolate, but tried to be brave and to do something with the correspondence that poured in on her from his friends over the whole world. But in a little while she fell ill with pneumonia and, unwilling to live, she responded to none of the efforts of the medical men, and died on November 27, 1922.

Sometime later, at 13 Norham Gardens, Lady Osler looked down at the Holland dahlias intended for Dr. Halsted, that still bloomed there and said wistfully, "How fortunate Mrs. Halsted was, to die so soon."

A memorial meeting for Dr. Halsted was held at 4 p. m. on Sunday, December 16, 1923, at the Johns Hopkins University, President Goodnow presiding, and at this meeting Dr. Finney, Dr. Matas and Dr. Welch spoke. There was a large audience and Mrs. Terry and Mrs. Vander Poel were there. These addresses were published in the Bulletin of the Johns Hopkins Hospital, 1925, Vol. XXXVI, 1.

It would be impossible to quote here the expressions of regret and admiration that came from every part of the world to Mrs. Halsted or to his colleagues after the death of Dr. Halsted, but a list of references to the printed addresses and memorial notices may be given at the end of this sketch. Surgeons in England, Germany, France and many other European countries, as well as those in this country, wrote to express their profound respect for his memory as a surgeon and as an investigator. Students and former assistants who had felt the inspiration of working under him were unanimous in their feeling of sorrow in his loss and of gratitude for his influence. Friends felt the irremediable loss of one whose place in their lives could never be taken by any one else, and patients were all mindful of the great blessings he had brought them in giving them comfort from pain, or a new lease of useful activity, or even their lives, and they were grateful. His colleagues in the University mourned his loss for all these reasons.

Dr. Kelly in 1925 writes from High Hampton Inn, Cashiers, North Carolina,

DEAR DR. WELCH:

I started out yesterday on a forty mile pilgrimage, out of respect to Halsted's memory, to this place which you have doubtless visited often. I expected it to be a tribute merely, but it has been a real joy, so intimately and so happily is his memory associated with everything here for miles around. The people are continually impressing upon me the affection and great respect in which he and Mrs. Halsted were held, and this to so marked a degree that this entire beautiful country in reality has become a veritable shrine to his personality. . . . .

This whole country is alive with dahlias, coming into bloom later, given by Mrs. Halsted to the people each fall after posting a notice at the Postoffice. . . . . I do feel as though Halsted's many friends and admirers ought from time to time to make this pilgrimage where those who did not know him so well will be able to appreciate his love of the beautiful and the tenderer side of his nature, known, of course, best to you.

XVIII

CONCLUSION

In attempting to estimate the significance of Dr. Halsted's work it seems that it was not so much his surgical discoveries and inventions, many and important as these were, as his general attitude toward surgery that is to be carefully considered. He was guided by a searching study of the pathological condition, was familiar with the defensive powers of the tissues and realized their inherent tendency to return to the normal architecture and functional activity when the injury had been overcome and the field cleared of débris. It was therefore his endeavour in his operative interventions to do nothing to weaken or obstruct the natural defenses of the tissues upon which he saw that he must rely. In addition, by careful attention to the precise bringing together of tissues which had been separated, he tried to facilitate the return to the normal architecture and to restore the function.

It seems that his greatest service was in that he worked out an attitude in operating upon the human body which must forever be the proper attitude of the surgeon. It was simply the recognition of the normal or physiological condition of the tissues which one should attempt to restore, realizing

thoroughly their natural defenses and the reasons for their vulnerability.

It was not Listerism, for Lister, with whose work he was of course quite familiar, thought always of bacteria and felt them in the air about him so that his ingenuity was concentrated upon blocking their entrance into the wound from the outer world. With a choking spray of carbolic acid to kill those in the air, and more carbolic acid to destroy those that reached the wound, he succeeded in checking the perfect pestilence of fatal infections that was due to the outburst of surgical activity and the new daring that followed the introduction of general anæsthetics. The idea of aseptic surgery, which is to be credited to von Bergmann and Schimmelbusch, was a great advance, but that, too, was concentrated on the bacteria. If they could be completely excluded, all was well.

Dr. Halsted found that he could introduce a quantity of bacteria into the peritoneal cavity of a dog with no ill effect as long as he carefully avoided any mechanical injury to the tissues, but if he bruised or cut off from its blood supply some small part of the tissue in this cavity, a single bacterium lodged there was able to multiply and cause a fatal peritonitis.

This was the key to the whole situation in his mind. The tissues are powerful to defend themselves against bacteria if they are not injured, and the injuries by which the surgeon most commonly breaks

down their powers of defense are crushing and the obstruction of the blood supply. The ligation of a mass whose blood supply is thus cut off in order to stop hæmorrhage is the commonest fault, and the rough tearing or crushing of tissues in the course of an operation, the second. All the gross measures of the Lister era, attempting to destroy bacteria after their entrance, and the more refined methods of the aseptic era, attempting to exclude them, were, of course, familiarly utilized by Dr. Halsted throughout his life, and indeed he emphasized the obvious fact that we shall never be able to discard the use of antiseptics, and was particularly enthusiastic over the use of the Carrel-Dakin irrigations in bringing about the healing of old infected wounds or sinuses. But behind it all, he knew that the natural defenses of the body should be most carefully guarded and protected, and that they should not be imperilled by any unnecessary interference with their normal surroundings, and especially with their nutrition. Vacant spaces in the tissues in which fluid might accumulate form an infraction of this rule, and such fluid may well, since it is not living and active, serve as a medium for the growth of great quantities of bacteria. Curiously enough, blood, even when it clots, has retained much of its powers of defense, and a blood clot is not easily infected. Drainage by means of tubes and gauze, he endeavored to avoid, realizing the risks that it introduced and the temptation to slovenly surgery, so that whenever possible it was

banished. Catgut sutures, since they are irritating and produce an exudate which may afford a foothold for bacteria, were never used in uninfected wounds.

This, then, was his principle of action which he conceived, as I think, quite independently in New York, and which he elaborated in his early years in the laboratory when he came to Baltimore. It was, essentially, to operate with the utmost respect for the integrity and nutrition of the tissues, to be extremely careful to stop hæmorrhage from all the tiny severed blood-vessels, to bring together separated tissues in their natural relations if possible, and to leave no vacant spaces where stagnant fluid might collect and form a soil defenseless against the growth of bacteria, except when a bloodclot was deliberately allowed to fill an unavoidable vacant space. And that was all, but enough to make his operations procedures of mathematical precision, with healing almost as precisely ensured.

It is above all important, at the risk of wearisome repetition, to make it clear that this is not Lister's antiseptic technique alone, nor the aseptic technique alone, but it is a different surgical attitude which emphasizes the necessity of maintaining the defensive power of the tissues by preserving their blood supply and protecting them from injury.

All of this is comprehended in the thoughtful paper of Elliott C. Cutler:

> In modern times, surgery practised by the hands, but without a knowledge of anatomy, physiology and bacteriology

would not be tolerated. Fortunately a school for "safety in surgery" arose in this country under the stimulus, guidance and example of the late William Stewart Halsted. He demonstrated that an operation lasting three or even four hours, if all the principles of surgery were utilized, did little harm to the patient. His painstaking devotion to hæmostasis, to asepsis, to the delicate handling of tissues and to the artistic finish of his handicraft, were of the greatest value to surgery.

Leriche, Matas, Tuffier and others have recognized this in their critical reviews of what they had seen in Dr. Halsted's clinic, and it is perhaps difficult for all the men who have come under his influence to realize any other attitude, so natural does it seem to protect the tissues and to depend upon them for defense, and not to handicap them in this task by unnecessary injury. It is devoutly to be hoped that none of those who have worked under this master will relax to the easier, careless methods of the average surgeon, and that none will fail to pass on to their assistants the training that they themselves have had. It is hard for one not familiar with the details of what now goes on in surgical clinics throughout the world, to say whether there has been an advance in surgical technique since his time. From what I gather in conversation with many surgeons, there is rather a relaxation from his extreme precision, and with trust in the healing powers of nature, success is reached, but by a narrow margin.

There follows a list of Dr. Halsted's original contributions in surgery made for Dr. Souchon of New

Orleans who was compiling an encyclopædic article on American surgery.

1880. Introduced a film-like gutta-percha tissue as a dressing for wounds and as a drainage material, now in universal use.

1884. Created intradermal and neuro-regional or block anæsthesia.

1884. Performed on the human subject the first centripetal transfusions into arteries and the first refusions of blood; these were depletory transfusions, the patient's blood having been withdrawn and mechanically freed of the poison of illuminating gas, was returned centripetally into an artery.

1885. Excised the inferior dental nerve after blocking it with an injection of a solution of cocaine.

1885. Discovered that local anæsthesia might be produced by intradermal injections of very weak solutions of cocaine and even of water.

1886. Recommended and practiced the treatment of urethritis by flushings with mild antiseptic solutions ($HgCl_2$), making the first counts of the microorganisms.

1887. Directed attention to the submucous coat of the intestine, and to the necessity of including this coat in operations upon the intestine. Performed on animals the first operations of reversal of the intestine, and the first isolation of intestinal loops.

1888. Made the discovery, simultaneously with Sir Victor Horsley, but independently, that after the removal of a portion of the thyroid gland in dogs there occurs a hyperplasia of the part remaining with characteristic histological changes, and that the thyroid gland of puppies of thyroidectomized parents become likewise hypertrophied.

1889. Described a radical operation for the cure of cancer of the breast, up to that time a rarely cured disease.

1890. Introduced the use of rubber gloves in performing surgical operations.

1890. Devised an operation for the cure of inguinal hernia, an affection regarded until then as almost incurable.

1891. Performed the first successful ligation of the first portion of the left subclavian artery; also the first excision of a subclavian aneurysm.

1893. Performed three choledochotomies, the first in America.

1896. Performed the first excision of a cancer of the diverticulum of Vater, transplanting successfully the common bile duct into the duodenum.

1896. Introduced silver foil as a dressing for closed wounds, skin grafts, etc.

1903. Devised the buried plate and screw method for the treatment of fractures.

1903. Recommended the use of the cremaster muscle in the treatment of the oblique variety, and of the sheath of the rectus abdominis muscle in the treatment of the direct variety of inguinal hernia,—modifications of the original procedure of 1890.

1905. Devised a method for the partial, progressive and complete occlusion of the aorta and other large arteries by the use of metal bands, also an instrument with which to curl and apply these bands.

1906. Demonstrated on dogs the possibility of the transplantation of the parathyroid glands, and discovered the law that for the successful transplantation of these glands, a deficiency must be created.

1910. Contrived, with Dr. W. D. Gatch, the bulkhead method of performing an end to end anastomosis of the intestine.

1912. Made report of a dog maintained in good health by a parathyroid autograft one quarter of a millimeter in

diameter. Three weeks after removal of the transplant the dog died of tetany.

1912. Cured an iliofemoral aneurysm by partial occlusion with a metal band of the common iliac artery.

1912. Reported a new operation for mammary cancer which eliminated the danger of swelling of the arm.

1915. Determined experimentally the cause of aneurysm of the subclavian artery observed in cases of cervical rib.

1915. Devised a new method of draining the common duct which eliminates the danger from loss of bile.

1920. Devised the blind-end anastomosis of the large intestine. The closed ends are abutted and the double diaphragm punctured by a guarded knife passed per rectum.

1921. Proved clinically and experimentally that the swelling of the arm following operations for cancer of the breast is due to infection.

1922. Demonstrated with Dr. F. L. Reichert and Dr. Mont R. Reid, that entire limbs may be successfully transplanted without suture of the blood-vessels.

Author of monographs on goitre and the surgery of the great arteries.

Perhaps the most brilliant of Dr. Halsted's actual discoveries was the conduction anæsthesia that he produced by injecting the new found cocaine into a nerve. His best paper seems to be that on the "Ligation of the Left Subclavian Artery."

Then, in spite of all the long list of his published contributions to the science and art of surgery, I prefer to think that his third great accomplishment lay in the training and inspiration, less by actual teaching than by his irresistible example of a whole

school of surgeons who are imbued with his principles of thought and action, and who are already handing down to their assistants these principles, and impressing upon them the knowledge that they originated in Dr. Halsted.

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